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Taxonomic revision of the new spider genus *Hortophora*, the Australasian Garden Orb-weavers (Araneae, Araneidae)

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Abstract

The new genus *Hortophora* in the orb-weaving spider family Araneidae Clerck, 1757 is established to include 13 species from the Australasian-Pacific region, with ten species known from Australia (five of which new to science): *Hortophora biapicata* (L. Koch, 1871), **comb. nov.** (type species) (= *Araneus biapicatifera* Strand, 1907, **syn. nov.**; = *Epeira frosti* Hogg, 1896, **syn. nov.**); *H. cucullus* **sp. nov.**; *H. lodicula* (Keyserling, 1887), **comb. nov.** (= *Epeira scutigerens* Hogg, 1900, **syn. nov.**); *H. megacantha* **sp. nov.**; *H. porongurup* **sp. nov.**; *H. tatianeae* **sp. nov.**; *H. transmarina* (Keyserling, 1865), **comb. nov.**) (also known from Papua New Guinea); *H. urbana* (Keyserling, 1887), **comb. nov.**; *H. walesiana* (Karsch, 1878), **comb. nov.** (= *Epeira rhombocephala* Thorell 1881, **syn. nov.**; = *Epeira lutulenta* Keyserling, 1886, **syn. nov.**); and *H. yesabah* **sp. nov.** The following species of *Hortophora* **gen. nov.** are recognised from the Pacific region but not revised in detail due to a lack of material, specifically mature males: *Hortophora capitalis* (L. Koch, 1871), **comb. nov.** (removed from synonymy with *H. transmarina* **comb. nov.**) from Fiji, New Caledonia and Vanuatu; *H. flavicoma* (Simon, 1880), **comb. nov.** from New Caledonia (incl. Loyalty Islands) and *H. viridis* (Keyserling, 1865), **comb. nov.** (removed from synonymy with *H. transmarina* **comb. nov.**) from Samoa. *Epeira thyridota* Thorell, 1870 is here removed from synonymy with *H. transmarina* **comb. nov.** and transferred to *Backobourkia* Framenau, Dupérré, Blackledge & Vink, 2010, *B. thyridota* (Thorell, 1870), **comb. nov.** *Hortophora* **gen. nov.** includes medium-sized to large, nocturnal orb-weaving spiders typically with subtriangular to ovoid abdomen bearing humeral humps. The tibiae of the second leg in males is usually enlarged with numerous strong spines and an apico-ventral megaspur carrying a large spine in some species. Male pedipalps generally have an elongated, transverse median apophysis ending in a bifid tip in most species, a sinuous to straight embolus and a bubble-shaped terminal apophysis. The female epigyne scape is highly elongated and does not have a terminal pocket. Genital mutilation, i.e. breaking off the epigyne scape during copulation, is common in some species. *Hortophora* **gen. nov.** include the most frequently collected nocturnal orb-weaving spiders in Australia.

Key Words

Taxonomy, systematics, new genus, Australia, backobourkiines

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Introduction

Following their original descriptions in the mid- to late 1800s, few species of Australian orb-weaving spiders in the family Araneidae Clerck, 1757 have attracted detailed taxonomic attention (e.g., Davies 1980; Levi 1983; Framenau et al. 2010; Framenau 2011; Joseph and Framenau 2012; Kallal and Hormiga 2018; Castanheira et al. 2019). Most Australian Araneidae were originally placed in *Epeira* Walckenaer, 1805, today a junior synonym of *Araneus* Clerck, 1757 and more than 50 species currently remain in that genus for the country (Framenau 2019; World Spider Catalog 2021). However, a comprehensive investigation of araneids in Australian collections in the last ca. 15 years has shown that true members of the genus *Araneus* do not occur in Australia (VWF unpublished data).

Amongst the few Australian araneid species taxonomically treated since their original description are two species commonly referred to as 'Garden Orb-weavers', *Eriophora biapicata* (L. Koch, 1871) and *E. transmarina* (Keyserling, 1865) (Fig. 1A–C, G). Davies (1980) provided detailed descriptions for both species and maintained their placement in *Eriophora* Simon, 1864, earlier proposed by Musgrave (1933), Archer (1951) and Levi (1971). The genital morphology of Nearctic *Eriophora*, including the type species *E. ravilla* (C.L. Koch, 1845), is indeed similar to Australasian species currently placed in that genus, specifically the overall structure of male pedipalp sclerites, the generally enlarged tibia of the second leg in males and the very long epigyne scape of females. However, there are some notable differences in the main male pedipalp sclerites of the Nearctic species, specifically two macrosetae on the patella (only one in species from Australia and New Zealand; see Davies (1980)), the much more elongate radix and stipes (see Levi 1971, figs 2–4), and the median apophysis of the male pedipalp not forming an arch over the radix as in the Australian species. In addition, Nearctic *Eriophora* males have macrosetae on the trochanter of the fourth leg (see Levi 1971, figs 7, 48), which are absent in Australian species.

A recent multigene molecular analysis of world-wide Araneidae also suggested that Nearctic and Australian *Eriophora* are only remotely related (Scharff et al. 2020). Whereas Nearctic *Eriophora* grouped with other Nearctic genera, such as *Wagneriana* F. O. Pickard-Cambridge, 1904, *Parawixia* F. O. Pickard-Cambridge, 1904, and *Alpaida* O. Pickard-Cambridge, 1889, in a clade informally termed 'eriophorines', Australian representatives belonged to a largely Australian clade, informally termed the 'backobourkiines' (Scharff et al. 2020) (see also Kallal et al. (2018) and Kallal and Hormiga (2018) for non-monophyly of *E. ravilla* and *E. transmarina*). This clade also included representatives of the genera *Acroaspis* Karsch, 1878, *Backobourkia* Framenau, Dupérré, Blackledge & Vink, 2010, *Carepalxis* L. Koch, 1872, *Novakiella* Court & Forster, 1993, *Plebs* Joseph & Framenau, 2012 and *Singa* C.L. Koch, 1836. Consequently, Scharff et al. (2020) concluded that the two Australian *Eriophora* included in the analysis – *E. transmarina* and an undescribed "*Eriophora* NGEN01 64" – required the establishment of a new genus.

The aim of this study is to formally propose a new genus-group name for the Australian representatives of "NGEN01" (sensu Scharff et al. 2020), provide diagnostic characters for this genus and revise all species morphologically aligned with *E. transmarina* and *E. biapicata* as testable hypothesis of this genus for future phylogenetic work. We also transfer three Pacific Island species to the new genus based on female genital morphology, although only two respective female type specimens were available to us for study. These transfers must remain tentative pending the investigation of further material, specifically males, from the respective type localities.

Material and methods

Descriptions and terminology follow recent publications on Australian backobourkiine orb-weaving spiders (e.g., Framenau et al. 2010, 2021; Joseph and Framenau 2012). The descriptions of the views of the male pedipalp relate to their position as a limb, i.e. a full view of the bulb with the cymbium in the background of an image is a retrolateral view as in Araneidae the cymbium is situated mesally. Our standard views of the pedipalp therefore generally show the ventral view – to illustrate the generally diagnostic median apophysis – or the dorsal view – with the tegulum in full view – as the cymbium is situated to the side in the images. The term 'conductor lobe' is here used in preference over 'paramedian apophysis' for a structure originating at the base of the conductor in the male pedipalp (see Framenau et al. 2010, 2021 for discussions on this sclerite). The female epigyne consists of two main parts, the base (encapsulating the internal genitalia) and the scape.

Colour patterns are described based on specimens preserved in 75% ethanol. Male pedipalps were expanded by alternatively submerging it for 10 min in 10% KOH and distilled water until fully expanded. Redescriptions of historically named species are generally based on well preserved, recently collected material in lieu of often damaged and discoloured type specimens.

Throughout the course of this study that commenced in 2005, microscopic photographs were taken with two different stereo-imaging systems. A setup at the Natural History Museum of Denmark, Copenhagen, allowed taking images in different focal planes with a Nikon D300 digital SLR camera attached via a C-mount adapter from LM-Scope (http://www.lmscope.com) to a Leica M16A stereomicroscope. Images of different focal plains were stacked with Automontage (vers. 5.02) software from Syncroscopy to increase depth of field. We used 2 Nikon R1C1 wireless speedlights instead of fibre optics to illuminate the exposures. The latter were used as guide-light for focusing. A second set-up at the Harry Butler Institute,

Murdoch University, Perth, supported taking microscopic images in different focal planes (ca. 20–30 images) on a Leica DMC4500 digital camera mounted to a Leica M205C stereomicroscope and combined using the Leica Application Suite X, v. 3.6.0.20104. Images of two type specimens lodged in the ZMH and NHM (Figs 39A–C, 40A, B) were taken with a basic digital camera and an adapter through the ocular tube of the microscopes in those institutions. All photos were edited and mounted with Photoshop CC 2020.

A male pedipalp of *H. biapicata* comb. nov. was prepared for scanning electron microscopy (SEM) imaging by passing it through a graded ethanol series of 70% to 100% and by subsequent critical point drying in a Baltec CPC-030 Critical Point Dryer. The specimen was then coated with Platinum-Palladium in a JEOL JFC-2300HR high resolution coater prior to scanning at 7kV in a JEOL JSM-6335F Field Emission Electron Microscope.

Maps were compiled in the software package QGis v. 2.14.0 Girona (https://qgis.org/en/site/; accessed 21 January 2020). Geographic coordinates were extracted directly from original labels or the registration data as provided by the museums. When no detailed geographic information was available, localities were estimated based on Google Earth v. 9.1.39.3 (https://earth.google.com/web/; accessed 21 January 2021).

All measurements are given in millimetres. They were taken with an accuracy of one tenths of a millimetre, with the exception of eye and labium measurements taken with an accuracy of one hundredth of a millimetre. The taxonomic part of this study lists all species in alphabetical order.

Abbreviations

Collections

AM Australian Museum, Sydney, Australia;
HBI Harry Butler Institute, Murdoch University, Perth, Australia;
MCZ Museum of Comparative Zoology, Harvard, USA;
MNHN Muséum national d'Histoire naturelle, Paris, France;
MSNG Museo Civico di Storia Naturale 'Giacomo Doria', Genova, Italy;
MV Museums Victoria, Melbourne, Australia;
MWNH Museum Wiesbaden, Wiesbaden, Germany;
NHM Natural History Museum, London, England;
NHMD Natural History Museum of Denmark, Zoological Museum, University of Copenhagen, Denmark;
NRM Naturhistoriska riksmuseet, Stockholm, Sweden;
NTMAG Northern Territory Museum and Art Gallery, Darwin, Australia;
QM Queensland Museum, Brisbane, Australia;
SAM South Australian Museum, Adelaide, Australia;
SMNH State Museum of Natural History, Stuttgart, Germany;
UWP University of Poland, Wroclaw, Poland;
WAM Western Australian Museum, Perth, Australia;
ZMB Museum für Naturkunde, Zentralinstitut der Humboldt-Universität, Berlin, Germany;
ZMH Zoologisches Institut und Zoologisches Museum, Universität Hamburg, Germany.

Morphology

ALE, AME anterior lateral (median) eyes;
PLE, PME posterior lateral (median) eyes.

Results

This study is a substantial contribution to resolving the taxonomy of the Australian Araneidae. Of a total of 11,723 examined records (= vials in collections) of Australian Araneidae in the research database of the senior author (VWF), 1,649 belong to the genus *Hortophora* gen. nov., totalling 2,208 specimens (455 males, 1,501 females and 252 juveniles) (Table 1). This represents 14% of Australian orb-weaving spiders in Australian and selected overseas collections examined as part of our ongoing revision. Prior to this study, 56 Australian species were misplaced in the genus *Araneus* (Framenau 2019). Seven of these are here removed from that genus, either by transferring them to *Hortophora* gen. nov., or by recognising junior synonymies with species treated here. In addition, two out of three Australian *Eriophora* species and one out of 14 Australian species of *Cyclosa* Menge, 1866 are transferred to *Hortophora* gen. nov. A third Australian species currently listed in *Eriophora*, *E. pustulosa* (Walckenaer, 1841), belongs to another undescribed genus ("NGEN05" in Scharff et al. 2020), which is currently under revision (VWF, PSC, C.J. Vink unpublished data).

We recognise a total of ten species of *Hortophora* gen. nov. from Australia, one of which also occurs in Papua New Guinea (Table 1). A further three species occur in the Pacific region, i.e., Fiji, New Caledonia, Vanuatu and Samoa (Table 1). However, these three species are not revised in detail here as only their female type material is known and most diagnostic features of the genus are found in male genitalia. The transfer of these species to *Hortophora* gen. nov., however, may revive research interest in these species and spawn further collections of specimens, particularly males, to appropriately address taxonomic and systematic questions in relation to Pacific *Hortophora* gen. nov.

The centre of diversity of *Hortophora* gen. nov. is the east coast of Australia, specifically Queensland and New South Wales where nine of the ten Australian species occur; however, six species are also found in Western Australia, of which one, *H. porongurup* sp. nov., is endemic to the south-west of that state (Table 1).

Table 1. Species of *Hortophora* gen. nov., including information on primary types, distribution and number of records and specimens examined for this study. Abbreviations: ACT, Australian Capital Territory; NSW, New South Wales; NT, Northern Territory; Qld, Queensland; SA, South Australia; Tas, Tasmania; WA, Western Australia; m, males; f, females; j, juveniles.

Species	Primary types, type locality, depository	Distribution	No. of records examined (no. of specimens)
Australian species			
H. biapicata (L. Koch, 1871), comb. nov.	Holotype female, no exact locality (New Holland) (SMNH) (destroyed in WW2); Neotype male, 64 km W Westmar (Qld) (QM S361)	ACT, NSW, NT, Qld, SA, Vic, WA	647 (143m, 574f, 41j.)
H. cucullus sp. nov.	Holotype male, Pandappa Conservation Park (SA) (SAM NN19582)	NT, Qld, SA, WA	20 (3m, 16f, 2j)
H. lodicula (Keyserling, 18887), comb. nov.	Holotype female, Sydney (NSW) (ZMH Rack (1961)-no. 248)	ACT (inferred) NSW, Qld, Vic, Tas	45 (10m, 48f, 30j)
H. megacantha sp. nov.	Holotype male, North Stradbroke Island (Qld) (QM S116474)	NSW, Qld	27 (16m, 29f, 6j)
H. porongurup sp. nov.	Male holotype, Porongurup. National Park (WA) (WAM T75419)	WA	8 (5m, 6f, 6j)
H. tatianeae sp. nov.	Male holotype, East Ringwood (Vic) (MV K-14612)	ACT (inferred), NSW, Qld, SA, Tas, Vic	274 (84m, 262f, 75j)
H. transmarina (Keyserling, 1865), comb. nov.	Unspecified number of female syntypes, NSW (no exact locality) (some specimens in ZMH, NHM here considered part of the type series)	NSW, NT, Qld, WA, also Papua New Guinea	506 (149m, 483f, 79j)
H. urbana (Keyserling, 1887), comb. nov.	Male holotype, Sydney (NSW) (Bradley collection, considered lost)	NSW, Qld, WA	95 (33m, 63f, 9j)
H. walesiana (Karsch, 1878), comb. nov.	Holotype male, New South Wales (no exact locality) (ZMB 1429)	NSW, NT, Qld, WA	16 (4m, 11f, 1j)
H. yesabah sp. nov.	Male holotype, Dandabah, Bunya Mountains National Park (Qld) (QM S111896)	NSW, Qld	11 (8m, 9f, 3j)
Pacific Island species			
H. capitalis comb. nov.	Holotype female, Ovalau (Fiji) ZMH (Rack (1961)-catalogue 227)	Fiji, New Caledonia, Vanuatu	1(1f)
H. flavicoma comb. nov.	Holotype female from Canala (New Caledonia) (likely MNHN)	New Caledonia	-
H. viridis comb. nov.	Holotype female from Upolu (Samoa) (NHM 1890.7.1.4237)	Samoa	1 (1f)

Taxonomy

Class Arachnida Cuvier, 1812
Order Araneae Clerck, 1757
Family Araneidae Clerck, 1757

Hortophora Framenau & Castanheira gen. nov.

http://zoobank.org/2057AF8B-723A-4EA4-B731-FC8B443DE127

Type species. *Epeira biapicata* L. Koch, 1871 (designated here). Gender female.

Etymology. The generic name is composed of the stem *hortus* (Latin – garden), referring to the vernacular name of the species in Australia, Garden orb-weavers, and the ending *–phora* to indicate the similarity of the genus with *Eriophora*.

Diagnosis. *Hortophora* gen. nov. is here diagnosed against the only four genera of the backobourkiines (*sensu* Scharff et al. 2020) which have been revised with modern taxonomic methods: *Plebs*, *Backobourkia*, *Lariniophora* Framenau, 2011 and *Novakiella* (Framenau 2011; Framenau et al. 2010, 2021; Joseph and Framenau 2012). Other established backobourkiine genera, *Singa*, *Carepalxis* and *Acroaspis*, have not yet been revised in Australia and a diagnosis against those is not possible as their synapomorphies have not been defined based on modern taxonomic methods.

As we could not identify unambiguous synapomorphies of *Hortophora* gen. nov., we here propose the combination of the following characters to diagnose the genus within the backobourkiines: abdomen subtriangular to ovoid and generally with distinct humeral humps (Fig. 1A, C, D, F); tibia of the second leg of males enlarged with strong prolateral and ventral setae (e.g., Fig. 2A, C, F, G); male pedipalp with an elongated, transverse median apophysis, often ending in a bifid tip and with its base arching over the radix (Figs 3A–D, 4A, 5A, C); terminal apophysis bubble-shaped, ending in a heavily sclerotised elongated tip (Figs 3A–C, 4A–C), this tip accompanied at its base by a second pointy structure at least in *H. biapicata* comb. nov. (Fig. 5A, C, D); conductor lobe elongate, spatulate and with its end bent ventrally (Fig. 3A, D), this spatulate terminal part covered in scale-like structures (Fig. 5B); female epigyne base very compact; scape directed anteriorally at its base but then turning posteriorly, highly elongated and without a terminal pocket (e.g., Figs 7C, 10C, 13C).

Hortophora gen. nov. differ from *Backobourkia* by the absence of a basal flange on the median apophysis of the male pedipalp and by the generally much longer, not elongate triangular epigyne scape of females. In addition, *Hortophora* gen. nov. species lack the characteristic anterior triangular white marking and the strong spine-like setae found on the dorsum of abdomen in *Backobourkia*.

Hortophora gen. nov. species differ from those of *Plebs* by an overall much larger body size, although large *Plebs* such as *P. bradleyi* (Keyserling, 1887) may overlap in size with smaller *Hortophora* gen. nov. *Plebs* species have a comparatively longer abdomen and *Hortophora* gen. nov. species lack the characteristic ventral abdominal pattern of *Plebs*, i.e. a squared, light Ü-pattern with the dots placed near the spinnerets. Most *Hortophora* gen. nov. species have indistinct lateral light lines on the ventral abdomen, sometimes with transverse light bands or patches (e.g., Fig. 1B, G, E). Genital morphology of *Hortophora* gen. nov. and *Plebs* is similar, but male pedipalps of *Hortophora* gen. nov. generally have more pronounced, bubble-shaped

terminal apophysis and have no conspicuous tegular protrusion or tegular lobe (except in *H. lodicula* comb. nov.).

The subtriangular abdomen of *Hortophora* gen. nov. greatly differs from the elongate abdomen of *Lariniophora*. *Hortophora* gen. nov. males lack the bilobed outgrowth on the median apophysis characteristic for *Lariniophora*, and females present an epigyne not as elevated and generally with a longer scape.

Male *Hortophora* gen. nov. differ from *Novakiella* by the elongate and transverse median apophysis of the pedipalp (short and pointing basally in *Novakiella*) and a comparatively smaller conductor lobe (heavily enlarged in *Novakiella*). In contrast to that of *Novakiella* females, the female epigyne base of *Hortophora* gen. nov. is rounded in ventral view and without wrinkles (triangular base with transverse or lateral wrinkles in *Novakiella*).

Description. Median to large-sized orb-weaving spiders, males (TL 5.9–11.5) generally smaller than females (TL 7.00–22.00). Carapace longer than wide, pear-shaped and with cephalic region relatively narrower in males than in females; colouration variable from beige to reddish-brown, often covered with dense white setae (e.g., Figs 1A–D, F, 6A, C, E, G). Fovea longitudinal in males, but a roundish pit in females that somewhat extends anteriorly. Anterior median eyes largest, row of posterior eyes slightly recurved, lateral eyes almost touching, posterior lateral eyes apart from posterior median eyes by more than their diameter; lateral eyes of males on tubercles, anterior median eyes protruding from the carapace (e.g., Figs 6A, C, E, G, 9A, 10A). Sternum longer than wide with a sparse to dense cover of setae. Labium wider than long, with anterior glabrous light edge. Endites of male with lateral tooth. Chelicerae fangs with two to four promarginal teeth of differing sizes, and one to four retromarginal teeth of similar size. Legs: Leg formula I > IV > II > III. Tibiae II of males stronger than tibiae I and with heavy spination and sometimes with conspicuous apico-ventral megaspur that carries a strong spine (e.g., Fig. 2F, H, J). Abdomen slightly longer than wide, subtriangular to ovoid (except in *H. cucullus* sp. nov.; Figs 9A–C, 10A–B), without specialised setae, sigillae, condyles or other specific structures; dorsally with variable folium pattern and often with variable white patterns of guanine crystals (e.g., Fig. 1A, C, F). Venter with indistinct light lateral lines, sometimes pairs of white spots centrally or transverse light bands or patches.

Male pedipalp patella with a single macroseta (e.g., Fig. 3A, C, D) (two in *H. cucullus* sp. nov.; Fig. 9D, E); paracymbium elongated and hook-like (e.g., Figs 3, 7B, 9E); median apophysis generally elongate transverse with two or rarely three apical tips (e.g., Figs 3A–D, 4A, B, 5A, 7A, B, 9D) or shorter with apical lobes (e.g., Figs 12C, 30C); conductor lobe well developed and ending in a rounded spatula with a ventrally bent tip (e.g., Figs 3A–D, 4A, 7A, 9D, 12C); terminal apophysis bubble-shaped and tapering to a sclerotised, pointed tip (e.g., Figs 3A–D, 4A, 7A, 9D, 12C); conductor with sclerotised and membranous portions, carved ventrally to accommodate embolus and terminal apophysis tip (e.g., Figs 3A–D, 4A, 7A, 9D, 12C); embolus straight to sinuous, uncapped (e.g., Figs 3A–D, 4A, 9D). Epigyne base compact and strongly sclerotised with distinct atrium; scape highly elongated in most species (e.g., Figs 7C, 10C, 13C).

Composition. 13 species: *H. biapicata* comb. nov.; *H. capitalis* comb. nov.; *H. cucullus* sp. nov.; *H. flavicoma* comb. nov.; *H. lodícula* comb. nov.; *H. megacantha* sp. nov.; *H. porongurup* sp. nov.; *H. tatianeae* sp. nov.; *H. transmarina* comb. nov.; *H. urbana* comb. nov.; *H. viridis* comb. nov.; *H. walesiana* comb. nov.; *H. yesabah* sp. nov.

Distribution. Most species are restricted to Australia, with *H. transmarina* comb. nov. also found in Papua New Guinea (Table 1). *Hortophora capitalis* comb. nov. has been recorded in Fiji, New Caledonia and Vanuatu, *H. flavicoma* comb. nov. in New Caledonia and *H. viridis* comb. nov. in Samoa (Table 1).

Key to the species of *Hortophora* in Australia

Males

1 Abdomen drawn out dorsally and arching posteriorly beyond the spinnerets, laterally with small humps (Fig. 9A–C) ..... *H. cucullus* sp. nov.
– Abdomen not drawn out dorsally and without lateral humps, subtriangular to ovoid 2
2 Coxa II with apico-ventral hook (Fig. 7F) ..... *H. biapicata* comb. nov.
– Coxa II without apico-ventral hook 3
3 Median apophysis of male pedipalp elongate transverse and ending in two (rarely one or three) apical, ventrally bent small hooks (Figs 3A–D, 15C, 18C, 21C, 24C, 27C) 4
– Median apophysis ending in one (Figs 12C, 30C) or two (Fig. 33C) apical broad lobes 6
4 Median apophysis with distinct central protrusion (Figs 18C, 21C, 24C, 27C) 5
– Median apophysis without central protrusion (Figs 15C, 18C) 8
5 Total length > 12 mm; tibia of leg II with more than 20 strong prolateral and ventral spines and apico-ventral spur indistinct (Fig. 2I); abdomen venter with broad, transverse light bands (Fig. 24B) ..... *H. transmarina* comb. nov.
– Total length < 12 mm; tibia of leg II with less than 15 strong prolateral and ventral spines and apico-ventral spur distinct (Fig. 2F); abdomen venter with two narrow lateral light lines and pairs of light spots in between (Fig. 21B) ..... *H. tatianeae* sp. nov.

6 Median apophysis ending in a single apical lobe, conductor lobe not extended apically (Figs 12C, D, 30C, D) 7
– Median apophysis apically ending in two apical lobes, one of which being heavily sclerotised; conductor lobe extended apically (Fig. 33C, D)..... *H. yesabah* sp. nov.
7 Tip of terminal apophysis pointing towards base of pedipalp, in an almost 90 degree angle to embolus (Fig. 30C) ..... *H. walesiana* comb. nov.
– Tip of terminal apophysis pointing into the same direction as embolus (Fig. 12C)..... *H. lodicula* comb. nov.
8 Tibia of leg II with very large apico-ventral megaspur and spine (Fig. 2D); base of median apophysis heavily enlarged (Fig. 15C)..... *H. megacantha* sp. nov.
– Tibia of leg II without apico-ventral megaspur and spine (Fig. 2E); median apophysis base not enlarged but median apophysis apically highly elongated (Fig. 18C, D)..... *H. porongurup* sp. nov.

Females

1 Abdomen slightly drawn out dorsally and with lateral protrusions (Fig. 10A, B) ..... *H. cucullus* sp. nov.
– Abdomen not drawn out apically without lateral protrusions..... 2
2 Shape of epigyne scape unknown (broken off in all specimens examined), but base of epigyne of very distinct shape in ventral and posterior views (Fig. 18C, E) with comparatively small atrium, laterally surrounded by thick-walled, semi-circular, heavily sclerotised borders (Fig. 18C); central division in posterior view very wide (Fig. 18E)..... *H. porongurup* sp. nov.
– Epigyne base not with thick, sclerotised borders in ventral view and always with basally constricted central division in posterior view (e.g., Figs 7E, 16E, 22E)..... 3
3 Epigyne scape highly elongated, reaching by considerably more than half its length beyond the epigyne base (judged best in lateral view; Figs 7D, 16D, 22D, 25D) 4
– Epigyne scape reaching at most by about half its length posteriorly beyond the epigyne base (Figs 10D, 31D, 34D).. 7
4 Ventral abdomen with one or two broad, transverse light bands, particularly distinct just posterior of epigastric furrow (Figs 1B, 6D, H, 25B) 5
– Ventral abdomen without transverse light bands, but with narrow light lateral bands and ca. three pairs of light spots medially (Figs 16B, 22B)..... 6
5 Baso-lateral flaps of epigyne enlarged, so that they are visible in ventral view (Fig. 25C, E)..... *H. transmarina* comb. nov.
– Baso-lateral flaps of epigyne smaller and not visible in ventral view (Fig. 7C, E, G) ..... *H. biapicata* comb. nov.
6 Central division of epigyne broad, ca. one third the width of the atrium in posterior view (Fig. 16E); scape appears sinuous in ventral and lateral views (Fig. 16C, D)..... *H. megacantha* sp. nov.
– Central division of epigyne narrow, ca. one fifth of atrium (Fig. 22E)..... *H. tatianeae* sp. nov.
7 Epigyne scape not reaching beyond epigyne posteriorly (Fig. 31D)..... *H. walesiana* comb. nov.
– Epigyne scape reaching beyond epigyne posteriorly (Figs 10D, 28D, 34D)..... 8
8 Epigyne scape comparatively broad and thick and widening centrally (Fig. 28C, D) ..... *H. urbana* comb. nov.
– Epigyne scape comparatively narrow and thin and of similar width along its length (Figs 10C, D; 34C, D) 9
9 Anteriorly directed base of scape rectangular (Fig. 34C) ..... *H. yesabah* sp. nov.
– Anteriorly directed base of scape triangular (Fig. 10C)..... *H. lodicula* comb. nov.

Hortophora biapicata (L. Koch, 1871), comb. nov.

Figs 1A–C, 2A, 3A, B, 6–8

Epeira biapicata Koch 1871: 54–55, plate 4, fig. 4.
Epeira frosti Hogg 1896: 315–316, plate 24, fig. 1. **New synonymy**.
Araneus biapicatifera Strand 1907: 202–205. **New synonymy**.
Araneus biapicatus (L. Koch).- Rainbow 1911: 182.
Araneus biapicatifera (Strand).- Rainbow 1911: 183.
Araneus frosti (Hogg).- Rainbow 1911: 186.
Araneus transmarinus (Keyserling).- Dondale 1966: 1164–1166, figs 2D–G (misidentification; synonymy rejected by Davies (1980) and herein).
Eriophora biapicata (L. Koch).- Davies 1980: 128–130, figs 9–15.

Type material. ***Holotype*** of *Epeira biapicata* L. Koch, 1871: female, "Neuholland" (= Australia; no precise locality data in original description) (SMNH) (lost in WW2, see Davies 1980).

Neotype of *Epeira biapicata* L. Koch, 1871 (designated by Davies 1980): male, 64 km W of Westmar (ca. 27°59'S, 149°04'E, Queensland, Australia), R.J. Raven, V.E. Davies, 9 January 1979, mulga scrub (QM S361). Examined.

Holotype of *Epeira frosti* Hogg, 1896: female, Stevenson River (27°06'S, 135°32'E, South Australia, Australia), Horn Expedition (MV K-931). Examined.

Holotype of *Araneus biapicatifera* Strand, 1907: female, no exact locality, only given as "Australien" in Strand (1907) (MWNH 331). Microscopic photographs of the holotype examined.

Other material examined. See Appendix 1.

Diagnosis. Male and female *H. biapicata* comb. nov. are most similar to *H. transmarina* comb. nov. with which they share a comparatively large size and distinct ventral pattern of broad light transverse bands of the abdomen, particularly distinct just behind the epigastric furrow (Figs 1B, G, 6B, D, F, H, 24B, 25B). However, male *H. biapicata* comb. nov. differ from all other species of

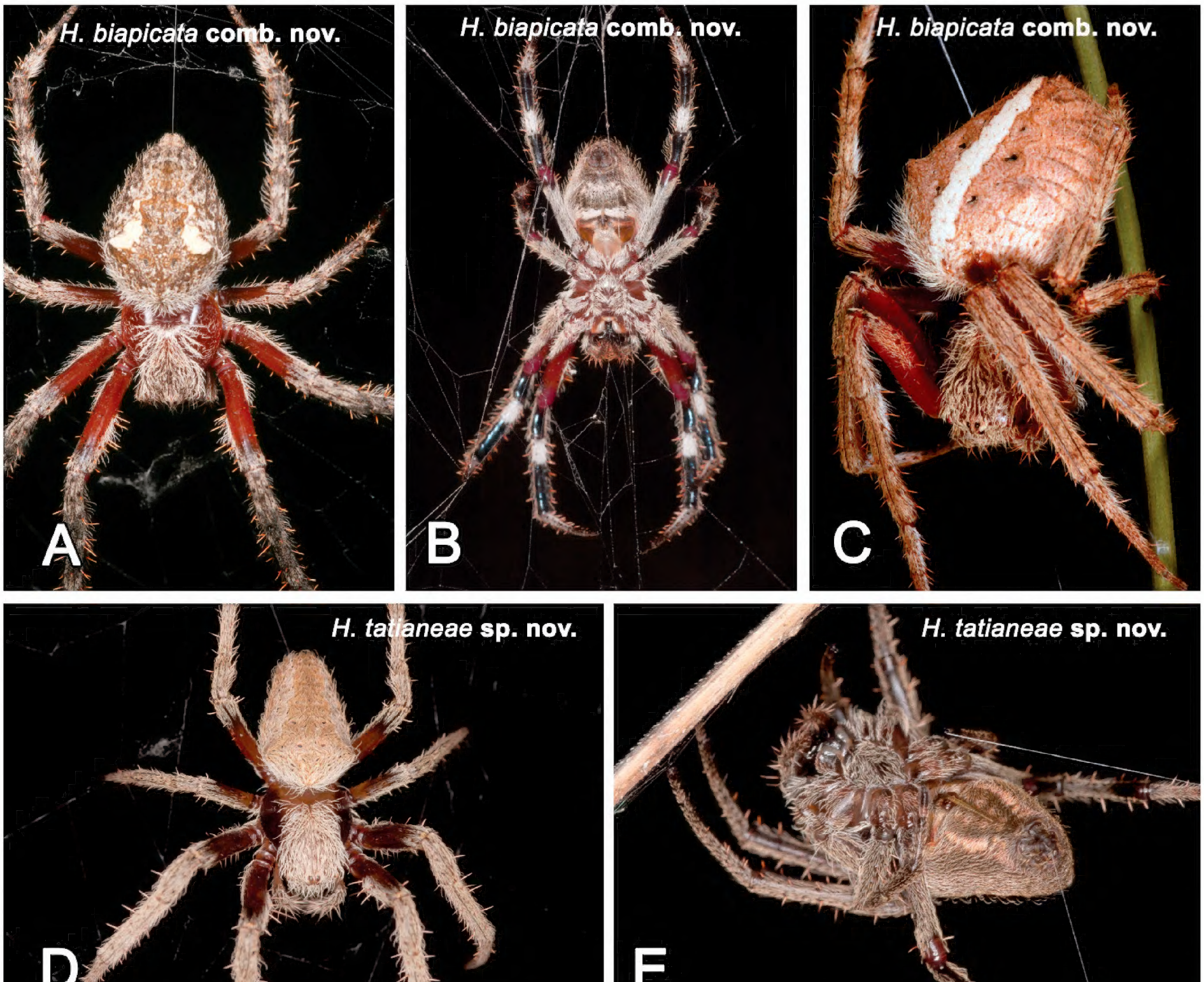

Figure 1. Live images of *Hortophora* gen. nov. species. **A, B.** *H. biapicata* comb. nov., female from Hovea (Western Australia) (not collected); **C.** *H. biapicata* comb. nov., female from Rivervale (Western Australia) (WAM T100125); **D, E.** *H. tatianeae* sp. nov., female from East Ringwood (Victoria) (WAM T68055); **F.** *H. tatianeae* sp. nov., holotype male (Ringwood East, Victoria) (MV K-14612); **G.** *H. transmarina* comb. nov., female from Burbank (Qld) (WAM T84364). All images © V.W. Framenau.

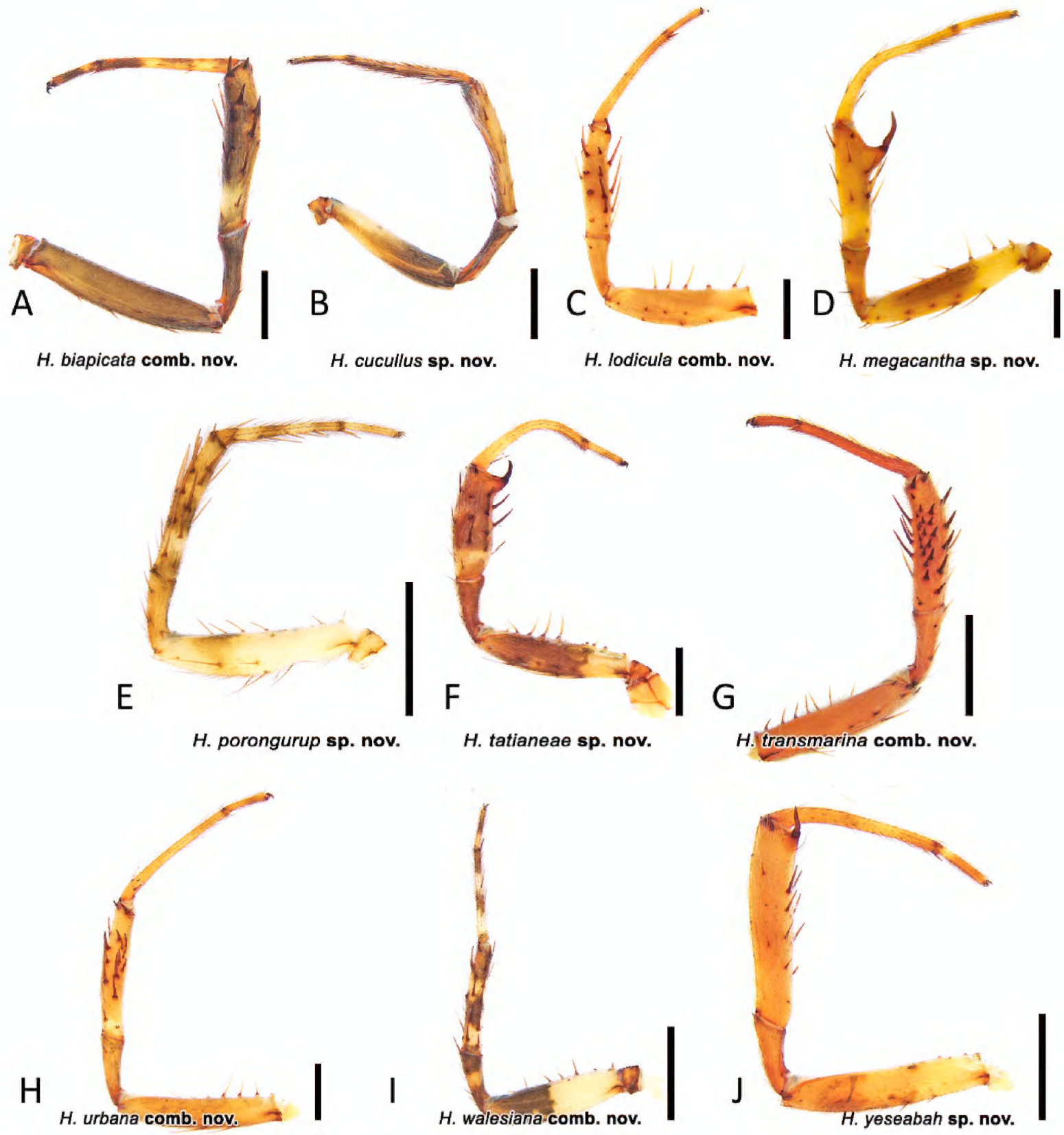

Figure 2. *Hortophora* gen. nov. species, second legs of male, prolateral view. **A.** *H. biapicata* comb. nov., right leg (HBI N18501-1); **B.** *H. cucullus* sp. nov., right leg (SAM NN19582); **C.** *H. lodicula* comb. nov., left leg (QM S116469); **D.** *H. megacantha* sp. nov., left leg (QM S116493); **E.** *H. porongurup* sp. nov., left leg (WAM T75419); **F.** *H. tatianeae* sp. nov., left leg (MV K-14612); **G.** *H. transmarina* comb. nov., right leg (QM S20307); **H.** *H. urbana* comb. nov., left leg (QM S111900); **I.** *H. walesiana* comb. nov., left leg (WAM T75383); **J.** *H. yesabah* sp. nov., left leg (QM S111896). Scale bars: 2 mm (**A–C**, **E**, **F**, **H–J**); 1 mm (**D**); 5 mm (**G**).

Hortophora gen. nov., including *H. transmarina* comb. nov., by the presence of coxal hooks on leg II (Fig. 7F). Female *H. biapicata* comb. nov. can be distinguished from those *H. transmarina* comb. nov. by the smaller baso-lateral flaps of the epigyne that bulge laterally in the latter and can be seen in ventral view (Fig. 25C), but not so in *H. biapicata* comb. nov. (Fig. 7G).

Description. Male (HBI N18501-1): Total length 10.5. Carapace 6.2 long, 5.0 wide; reddish-brown, lighter in cephalic area (Fig. 6A). Eye diameter AME 0.34, ALE 0.16, PME 0.29, PLE 0.18; row of eyes: AME 0.85, PME 0.65, PLE 2.30. Chelicerae reddish-brown; three promarginal teeth (basal smallest), three retromarginal teeth (similar size). Legs dark brown, femora basally lighter, tibiae, metatarsi and tarsi with yellow brown rings or spots (Fig. 6A, B). Coxae of leg II with hook-like projections (Fig. 7F). Tibiae of leg II enlarged with strong prolateral spines, but no distinct apico-ventral megaspur (Figs 2A, 6A, B). Leg formula I > IV > II > III; length of segments (femur + patella + tibia + metatarsus + tarsus = total length): I – 6.5 + 3.5 + 6.1 + 6.0 + 1.5 = 23.6, II – 6.1 + 2.8 + 4.6 + 0.9 + 0.8 = 15.2, III – 4.1 + 1.6 + 2.7 + 2.6 + 0.9 = 11.9, IV – 4.7 + 1.9 + 4.2 + 4.4 + 0.8 = 16.0. Labium 0.80 long, 0.92 wide, dark brown (Fig. 6B); endites light brown. Sternum 2.9 long, 1.7 wide, brown and covered by yellowish setae (Fig. 6B). Abdomen 6.0 long, 4.3 wide; dorsum olive-brown with indistinct lighter folium pattern; venter olive-brown with light transverse band behind epigastric furrow (Fig. 6B). Pedipalp length of segments (femur + patella + tibia + cymbium = total length): 1.1 + 0.5 + 0.3 + 2.0 = 3.9; paracymbium elongated, strongly sclerotised (Fig. 7B); median apophysis elongate transverse with pointy central protrusion and apically bifid curved tips (Figs 5A, 7A, H); terminal apophysis bubble-shaped

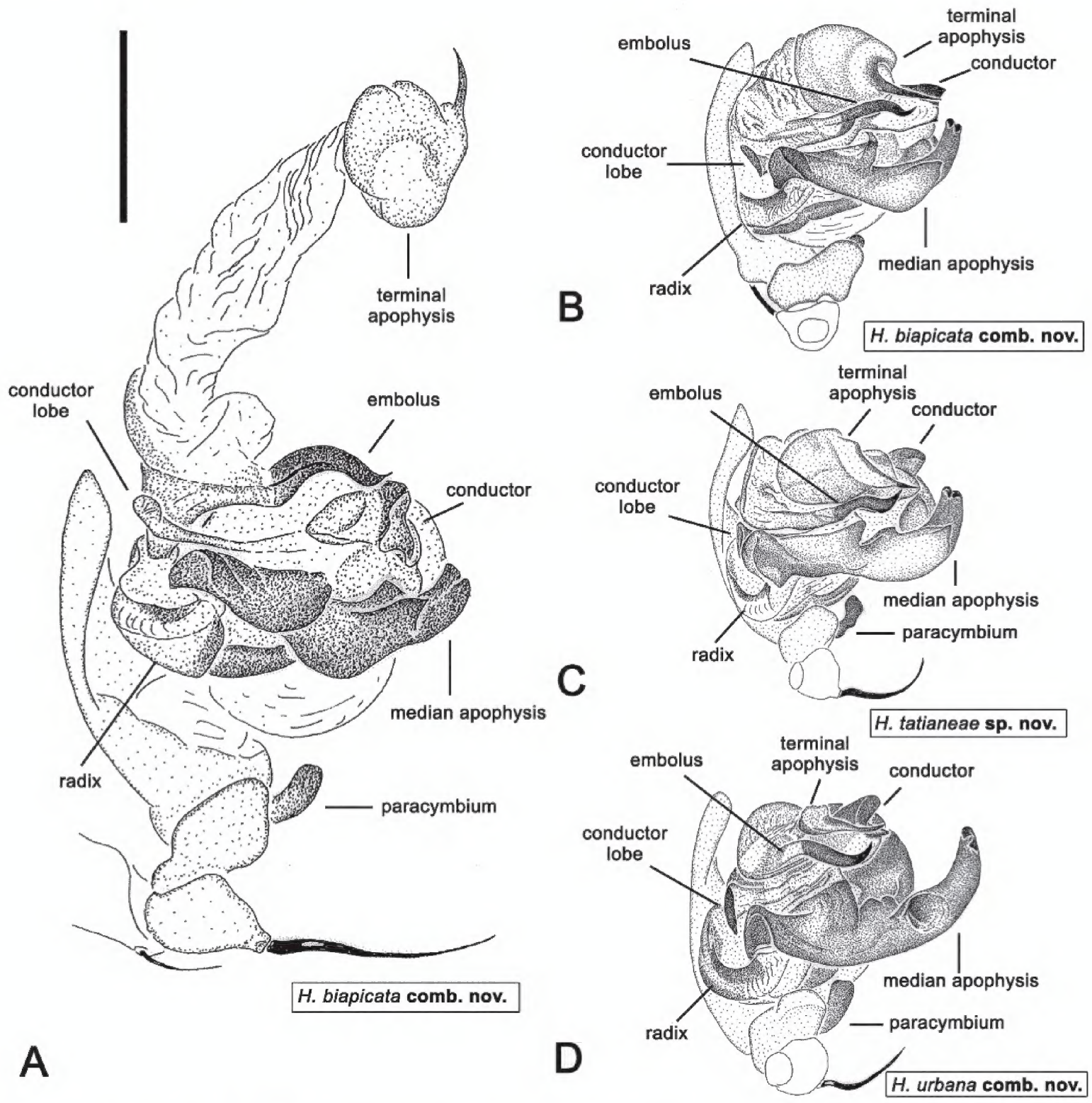

Figure 3. *Hortophora* gen. nov.**,** left male pedipalps, ventral view **A.** *H. biapicata* comb. nov. expanded (WAM T77043); **B.** *H. biapicata* comb. nov. (WAM T68036); **C.** *H. tatianeae* sp. nov. (WAM T68012); **D.** *H. urbana* comb. nov. (AM KS66276). Scale bars: 1 mm (**A**), 2 mm (**B–D**).

tapering into an elongated, sclerotised tip (Figs 5A, C, D, 7A); conductor with sclerotised apical and lamellar central portion (Fig. 7A); embolus heavily sclerotised, elongated with a sinuous tip (Figs 5D, 7A).

Female (HBI N26183-1): Total length 22.0. Carapace 8.7 long, 7.6 wide; reddish-brown, cephalic are darker; centrally covered with white setae (Fig. 6C). Eye diameter AME 0.36, ALE 0.27, PME 0.27, PLE 0.20; row of eyes: AME 0.92, PME 0.88, PLE 4.35. Chelicerae orange-brown; three promarginal teeth (similar size), three retromarginal teeth (basal largest). Leg femora reddish-brown, apically darker and without setae; all other segments very dark brown with bands of dark and white setae (Fig. 6D). Pedipalp length of segments (femur + patella + tibia + tarsus = total length): 2.5 + 1.1 + 1.8 + – + 3.2 = 8.6. Leg formula I > IV > II > III; and length of segments (femur + patella + tibia + metatarsus + tarsus = total length): I – 9.5 + 4.7 + 7.9 + 8.2 + 2.6 = 32.9, II – 8.6 + 4.2 + 7.5 + 0.9 + 2.4 = 23.6, III – 5.8 + 2.7 + 3.5 + 3.8 + 1.8 = 17.6, IV – 7.5 + 4.4 + 6.4 + 6.3 + 2.6 = 27.2. Labium 1.00 long, 1.68 wide, reddish-brown (Fig. 6D); endites as in male. Sternum 4.0 long, 3.0 wide, brown, covered by yellowish setae (Fig. 6D). Abdomen 12.5 long, 13.0 wide, indistinct humeral humps, dorsum dark olive-brown and mottled with light spots, central folium pattern darker (Fig. 6C); venter dark olive-brown with narrow light lateral lines and light transverse band behind epigastric furrow (Fig. 6D). Spinnerets brown. Epigyne (Fig. 7C–E) base ovoid; scape highly elongated and centrally slightly wider, dorsal narrow ridge in basal half (Fig. 7D), and covered with sparse short setae.

Variation. Size variation: total length males 11.3–16.3 (n=17), females 15.0–23.1 (n=19). Unlike in other *Hortophora* gen. nov. species, the female scape was never broken off in any of the females examined by us. There is great colour variation, specifically in the abdomen of both males and females, which may be almost uniformly light to dark brown, or have a distinct folium pattern (e.g., Figs 1A, 6E, G) and often distinct white guanine markings, either just spots (in particular posterior of the humeral humps (e.g., Fig. 1A, 6C, G), or longitudinal

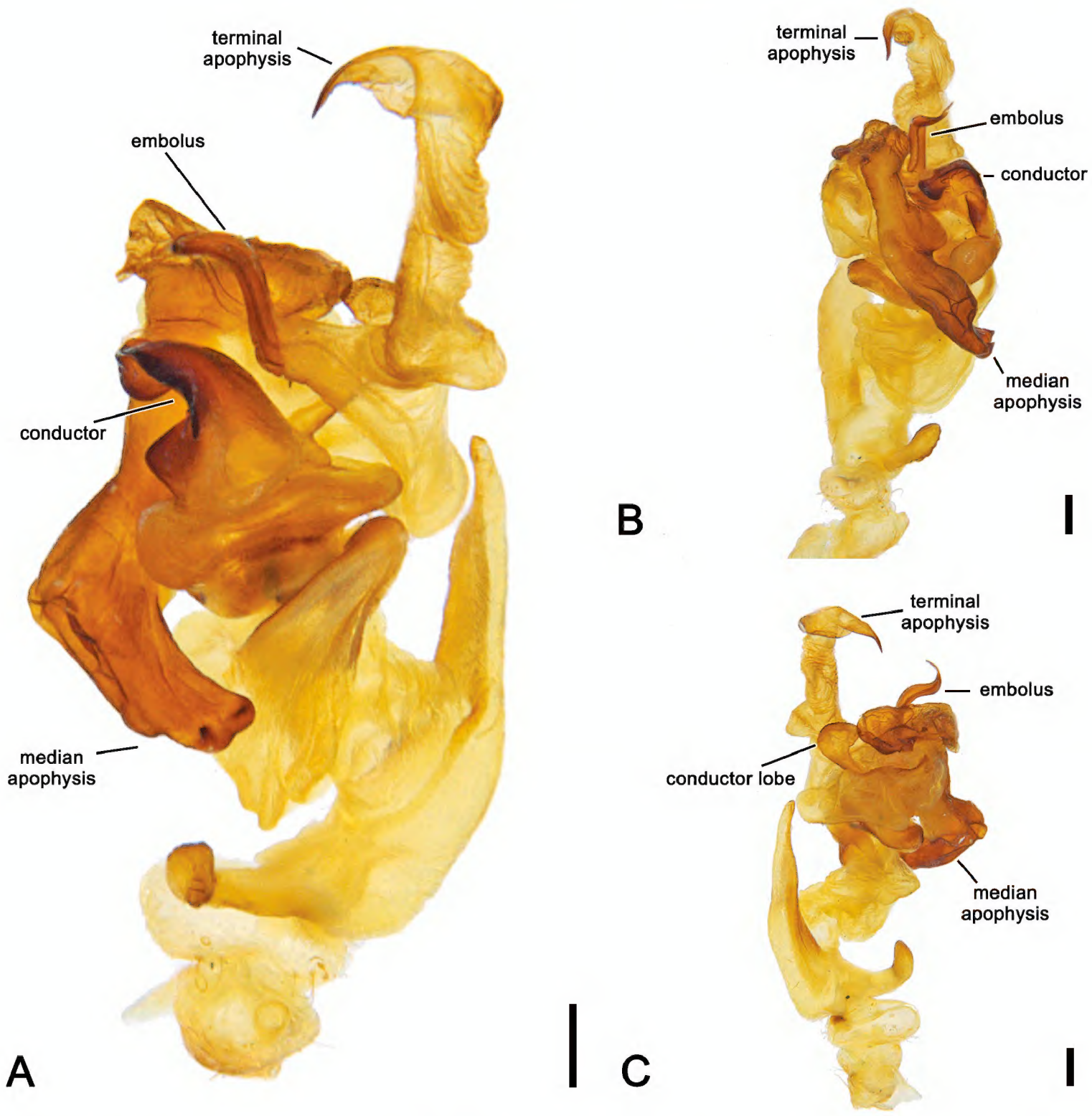

Figure 4. *Hortophora megacantha* sp. nov., expanded right pedipalp (QM S56709). **A**, dorsal view; **B**, retrolateral view; **C**, ventral view. Scale bars: 0.2 mm.

or transverse spots and lines (e.g., Fig. 1C, 6E). These patterns are not species-specific, occur similarly in other species and cannot be relied on to identify *H. biapicata* comb. nov.

The species was named after the often discernible two tips at the end of the abdomen in females. However, these cannot be seen in all specimens, in particular not in gravid or fully fed females and cannot be relied upon as diagnostic character.

Remarks. The holotype of *Epeira biapicata* L. Koch, 1871 was lost in WW2 when the Natural History Museum, Stuttgart was damaged. Davies (1980) designated a neotype for the species due to its similarities with *H. transmarina* comb. nov. to fix the taxonomic concept of the species-group name *Epeira biapicata*.

Two immature females from Ovalau (Fiji) (ZMH Rack (1961)-catalogue no. 225), Museum Godeffroy 7477) (examined) were mentioned in the original description and could potentially be considered part of the type series. However, we here follow Davies (1980) who excluded them from the type material as they were not explicitly described. Based on our examinations, Fiji does not belong to the distribution range of *H. biapicata* comb. nov. and it is likely that both specimens belong to *H. viridis* comb. nov., originally described from Fiji and here removed from synonymy with *H. transmarina* comb. nov. (see below), pending a more detailed review of orb-weaving spiders of the Pacific region.

The female holotype of *Epeira frosti* Hogg, 1896 (MV K-931) agrees well with the diagnosis of *H. biapicata* comb. nov. as presented here. It is therefore proposed as junior synonym of *H. biapicata* comb. nov. Detailed images of the female holotype of *Araneus biapicatifera* Strand, 1907 (MWNH 331) were examined and somatic and genitalic characters also match the diagnosis of *H. biapicata* comb. nov. presented here. Therefore, *A. biapicatifera* is here also proposed as junior synonym of *H. biapicata* comb. nov.

Life history and habitat preferences. The large majority of mature males of *H. biapicata* comb. nov. has been found between January and March, with no records between August and October and very few in all other months. Mature females show an extended activity from

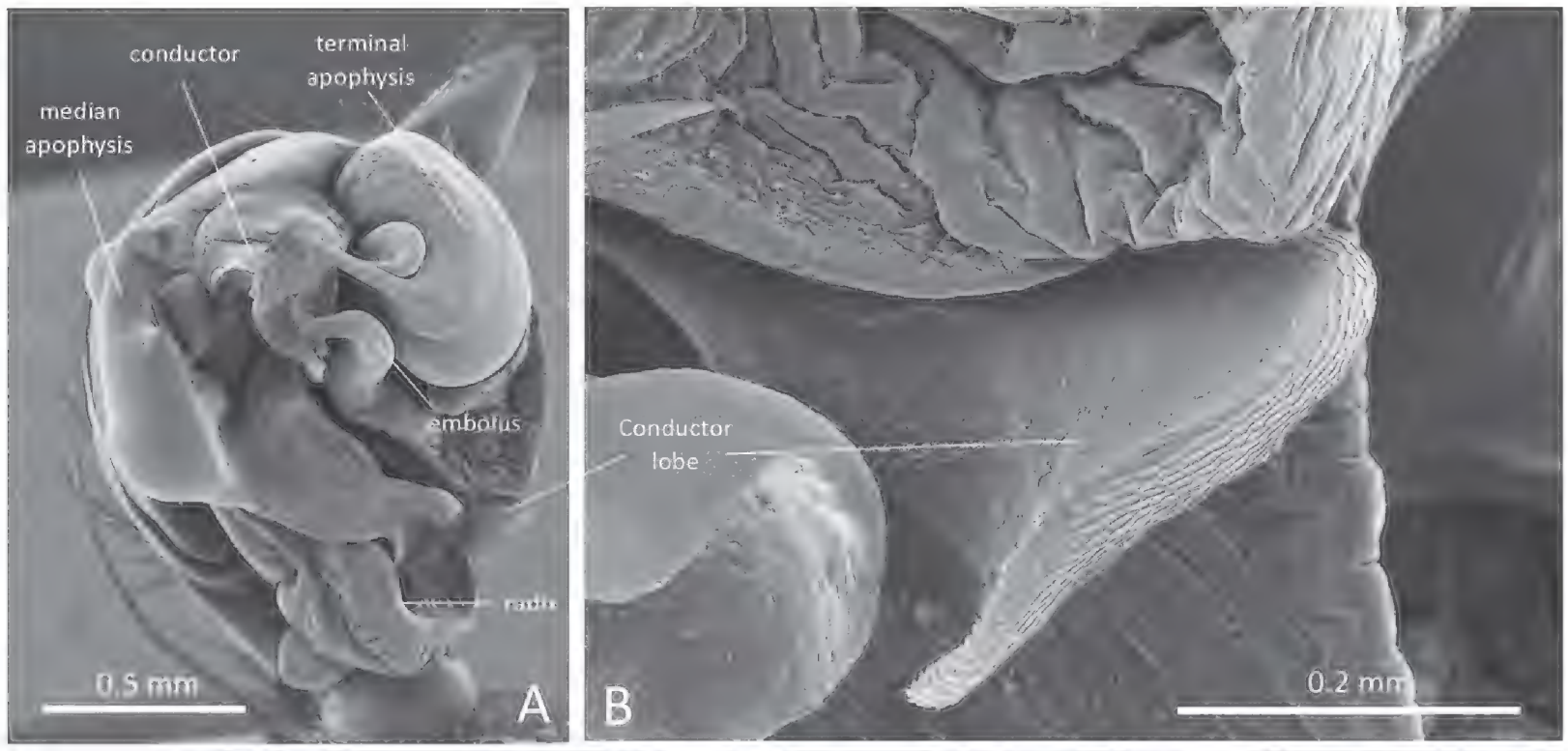

Figure 5. *Hortophora biapicata* comb. nov., scanning electron micrographs (SEMs) of right male pedipalp (NHMD, from Two Roads, Walpole-Nornalup National Park, Western Australia). **A.** whole pedipalp, retrolateral view; **B.** conductor lobe, retrolateral view; **C.** basal part of pedipalp, retrolateral view; **D.** close-up of conductor, embolus and tip of terminal apophysis, retrolateral view.

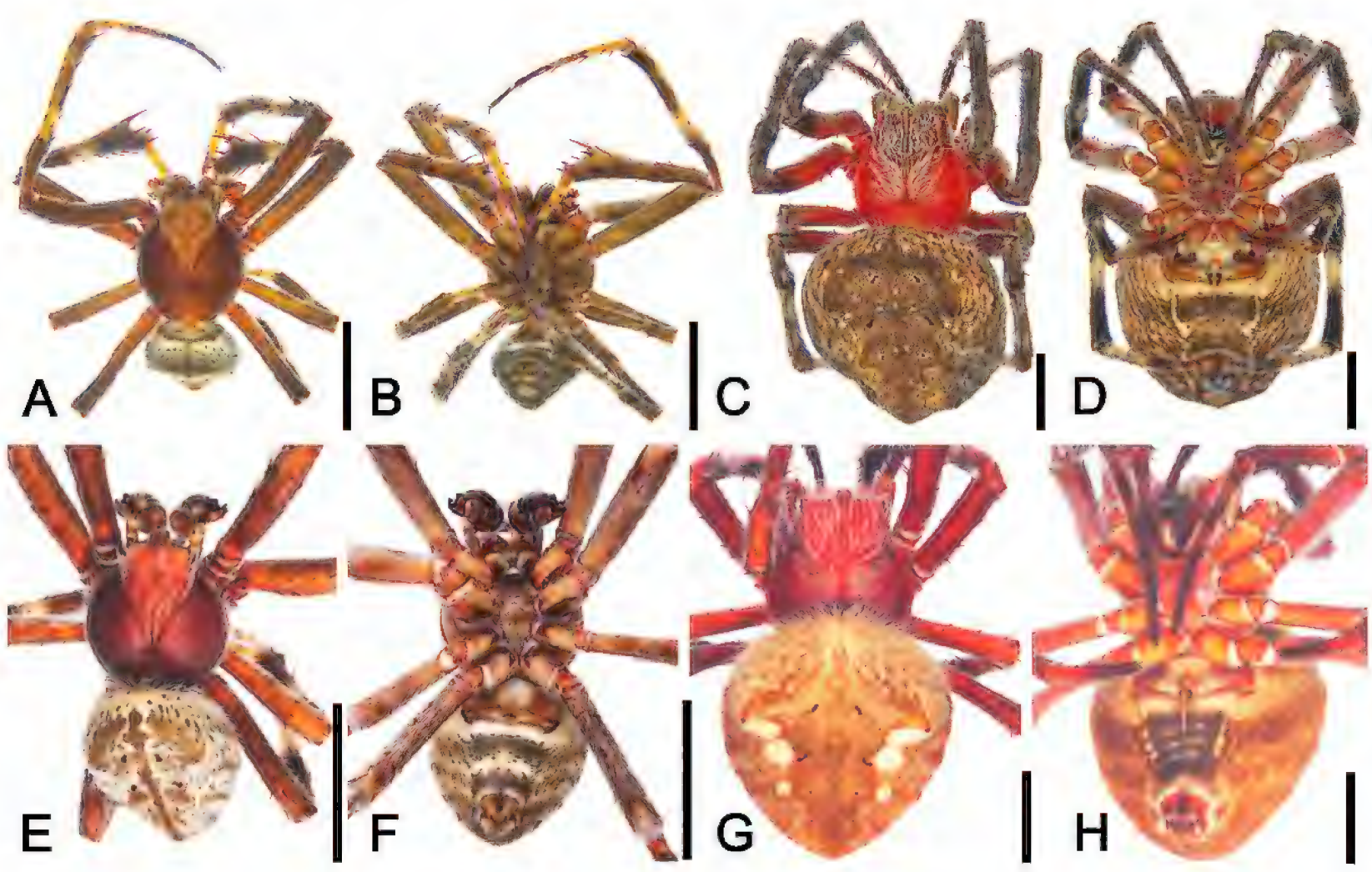

Figure 6. *Hortophora biapicata* comb. nov. **A.** male dorsal habitus (HBI N18501-1); **B.** male ventral habitus (HBI N18501-1); **C.** female dorsal habitus (HBI N26183-1); **D.** female ventral habitus (HBI N26183-1); **E.** male dorsal habitus (NHMD 12380); **F.** male ventral habitus (NHMD 12380); **G.** female dorsal habitus (NHMD 12371); **H.** female ventral habitus (NHMD 12371). Scale bars: 5 mm (**A–H**).

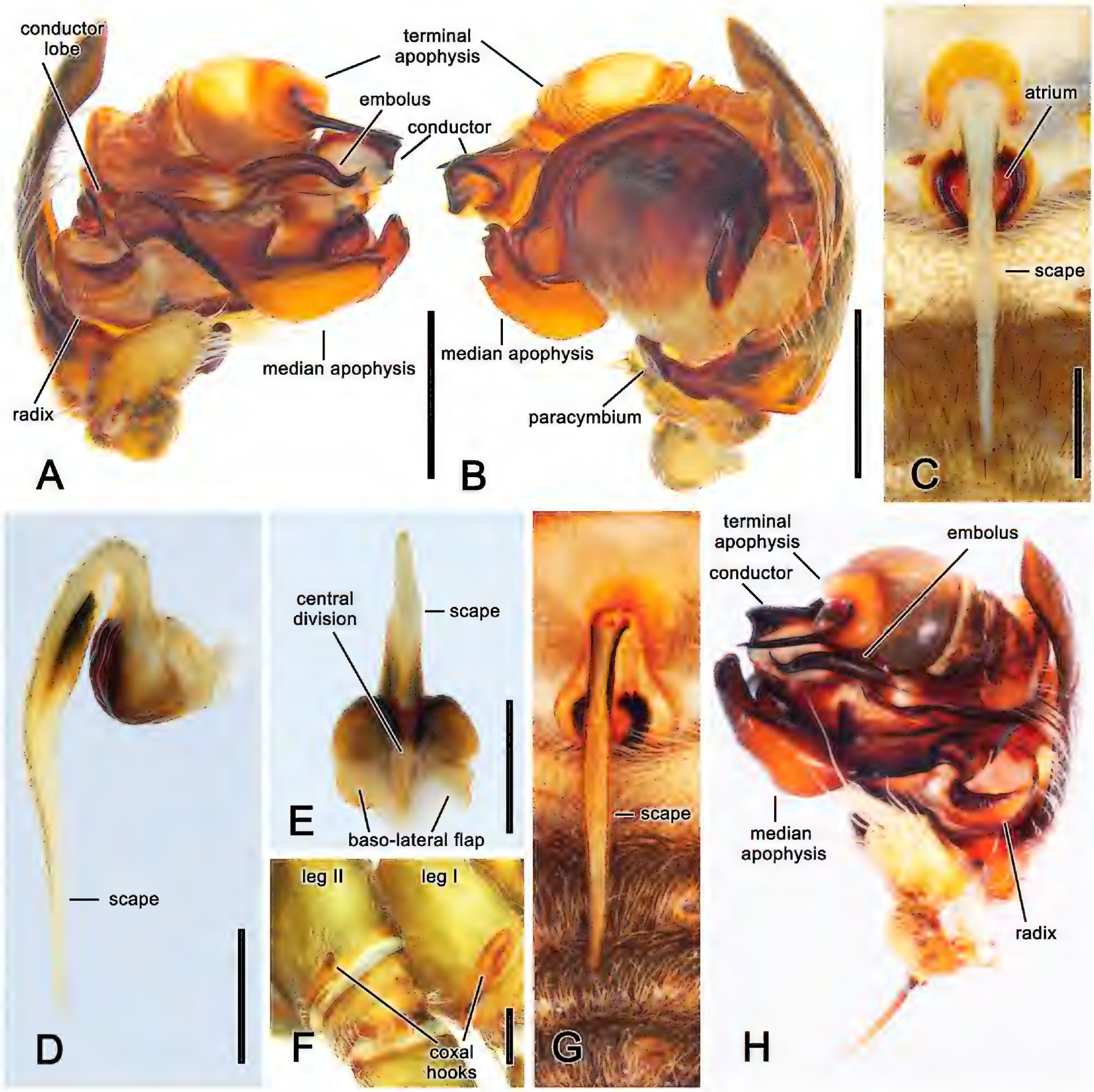

Figure 7. *Hortophora biapicata* comb. nov., male and female genitalia. **A.** left male pedipalp, ventral view (HBI N18501-1); **B.** left male pedipalp, ventral view (HBI N18501-1); **C.** female epigyne, ventral view (HBI N26183-1); **D.** female epigyne, lateral view (HBI 26183-1); **E.** female epigyne, posterior view (HBI N26183-1); **F.** male left coxae of legs I and II showing coxal hooks, ventral view (HBI N18501-1); **G.** female epigyne, ventral view (NHMD 12371); **H.** right male pedipalp, ventral view (NHMD 12380). Scale bars: 1 mm (**A–E, G, H**); 0.5 mm (**F**).

January to May, with few records in all other months. Therefore, main reproductive activity of *H. biapicata* comb. nov. occurs in summer, extending into autumn for females. This coincides with the late wet season in northern Australia.

Eriophora biapicata comb. nov. can be found in almost all habitats that allow it to span its large orb-web between shrubs and trees. The species is also common in man-made environments, such as suburban parks and gardens.

Distribution. *Hortophora biapicata* comb. nov. has been found throughout all Australian mainland states, but so far not in Tasmania (Fig. 8).

Hortophora cucullus Framenau & Castanheira sp. nov.

http://zoobank.org/3FDB1696-3815-49FD-ABD7-C1DFC9629E02

Figs 2B, 9–11

Type material. ***Holotype*** male, Pandappa Conservation Park (33°10'00"S, 139°08'15"E, South Australia, Australia), 22–25 April 2003, D. Hirst, night collection, mallee and sparse chenopods (SAM NN19582).

Etymology. The specific epithet is a masculine noun in apposition from Latin *cucullus* – a monk's hat, and refers to the distinct abdominal shape, specifically of the male of this species.

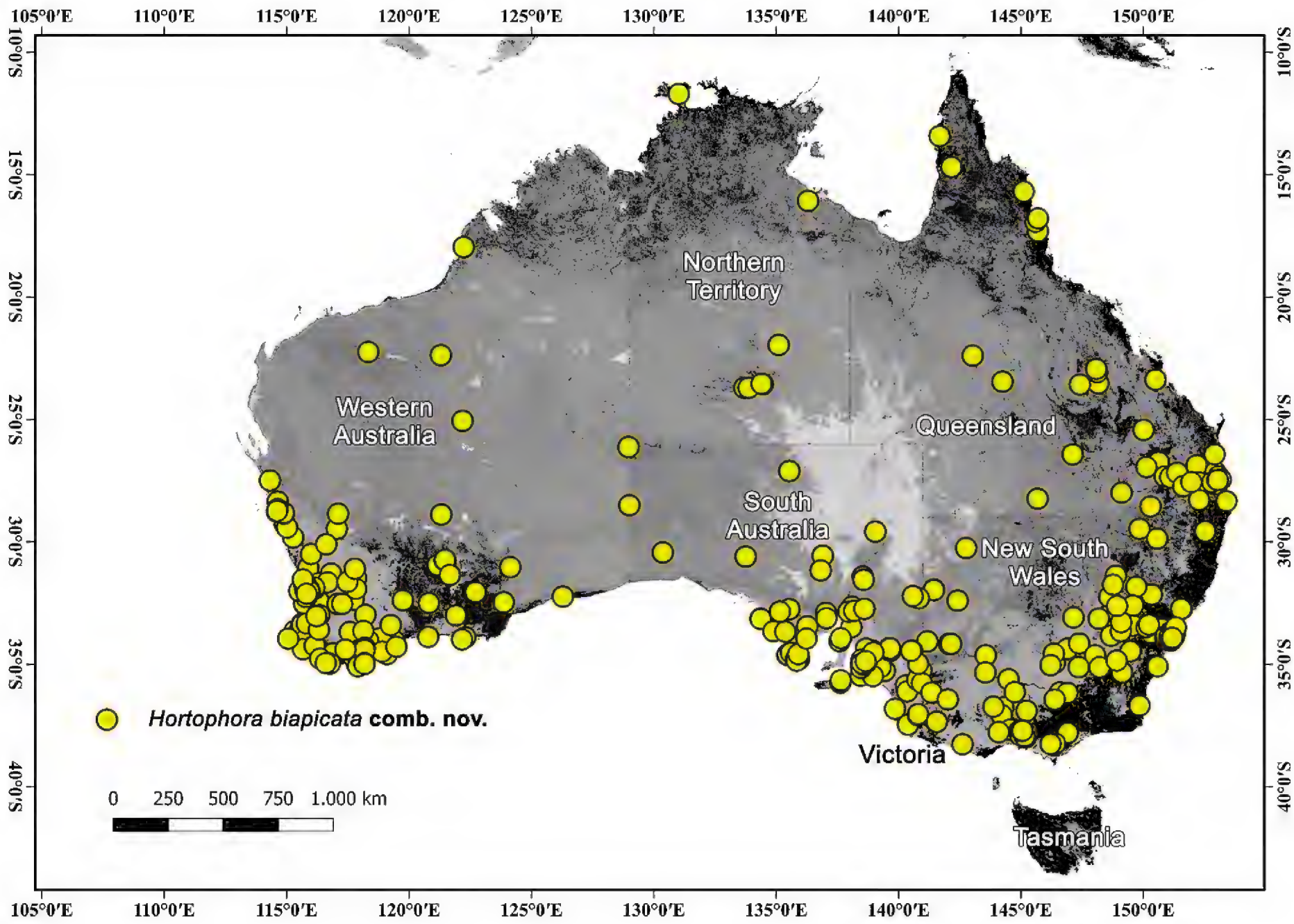

Figure 8. Distribution records of *Hortophora biapicata* comb. nov. in Australia.

Other material examined. See Appendix 1.

Diagnosis. Males of *Hortophora cucullus* sp. nov. can be easily identified from all other *Hortophora* species by the lateral lobes on the abdomen of both males (Fig. 9A) and females (Fig. 10A), which are absent in all other species. In addition, males (and less so females) differ by the dorsally drawn up abdomen (Fig. 9B). The male pedipalp *H. cucullus* sp. nov. has two macrosetae on the patella (Fig. 9E), one being smaller, but there is only one in all other *Hortophora* gen. nov. species.

Description. Male (holotype, SAM NN19582): Total length 11.5. Carapace 4.1 long, 2.9 wide, dark brown with yellow setae mainly centrally (Fig. 9A). Eyes diameter AME 0.23, ALE 0.13, PME 0.20, PLE 0.13; row of eyes: AME 0.67, PME 0.61, PLE 1.37. Chelicerae brown; two promarginal teeth and one retromarginal tooth. Legs brown to light brown, femora basally yellow-brown (Fig. 9A–C). Tibiae of leg II very little enlarged and without strong spines, but distinct white setae ventrally (Figs 2B, 9A–C). Leg formula I > IV > II > III; and length of segments (femur + patella + tibia + metatarsus + tarsus = total length): I – 5.0 + 2.6 + 4.7 + 4.0 + 1.6 = 17.9, II – 4.0 + 2.2 + 3.7 + 0.9 + 1.5 = 12.3, III – 2.9 + 1.3 + 2.0 + 1.5 + 0.9 = 8.6, IV – 3.4 + 1.8 + 3.3 + 3.4 + 1.2 = 13.1. Labium 0.36 long, 0.52 wide, brown; endites brown. Sternum 1.9 long, 0.9 wide, dark brown with few yellow setae (Fig. 9C). Abdomen 7.5 long, 3.5 wide, dorsally extended and arching posteriorly and with lateral protrusions (Fig. 9A–C); dorsum olive-brown and mottled yellow-brown (Fig. 9A–C); venter dark olive-brown (Fig. 9C). Pedipalp length of segments (femur + patella + tibia + cymbium = total length): 0.7 + 0.4 + 0.3 + 1.3 = 2.7; paracymbium short (Fig. 9E); median apophysis elongate transverse and apically bifid curved tip (Fig. 9D); conductor lobe large and rectangular, clearly connecting to the conductor basis from beneath the embolus (Fig. 9D); terminal apophysis bubble-shaped tapering into an elongated, sclerotised tip (Fig. 9D); conductor with strong sclerotised tip (Fig. 9D, E); embolus strong and curved apically (Fig. 9D).

Female (WAM T70164): Total length 13.1. Carapace 6.0 long, 5.2 wide; reddish-brown, cephalic area and lateral flanks darker, flanks covered in with white setae (Fig. 10A). Eyes diameter AME 0.32, ALE 0.18, PME 0.16, PLE 0.18; row of eyes: AME 0.88, PME 0.79, PLE 2.36. Chelicerae dark reddish-brown; four promarginal teeth (apical and third largest) and two retromarginal teeth (basal largest). Legs orange-brown and mottled in dark brown especially along joints (Fig. 10A, B). Pedipalp length of segments (femur + patella + tibia + tarsus = total length): 1.3 + 1.0 + 1.1 + 2.0 = 5.4. Leg formula I > IV> II > III; and length of segments: I – 6.2 + 3.6 + 4.8 + 4.1 + 1.5 = 20.2, II – 5.6 + 3.8 + 4.7 + 0.9 + 1.3 = 16.3, III – 4.1 + 2.1 + 2.0 + 2.3 + 1.0 = 11.5, IV – 4.6 + 3.2 + 4.0 + 3.9 + 1.3 = 17.0. Labium

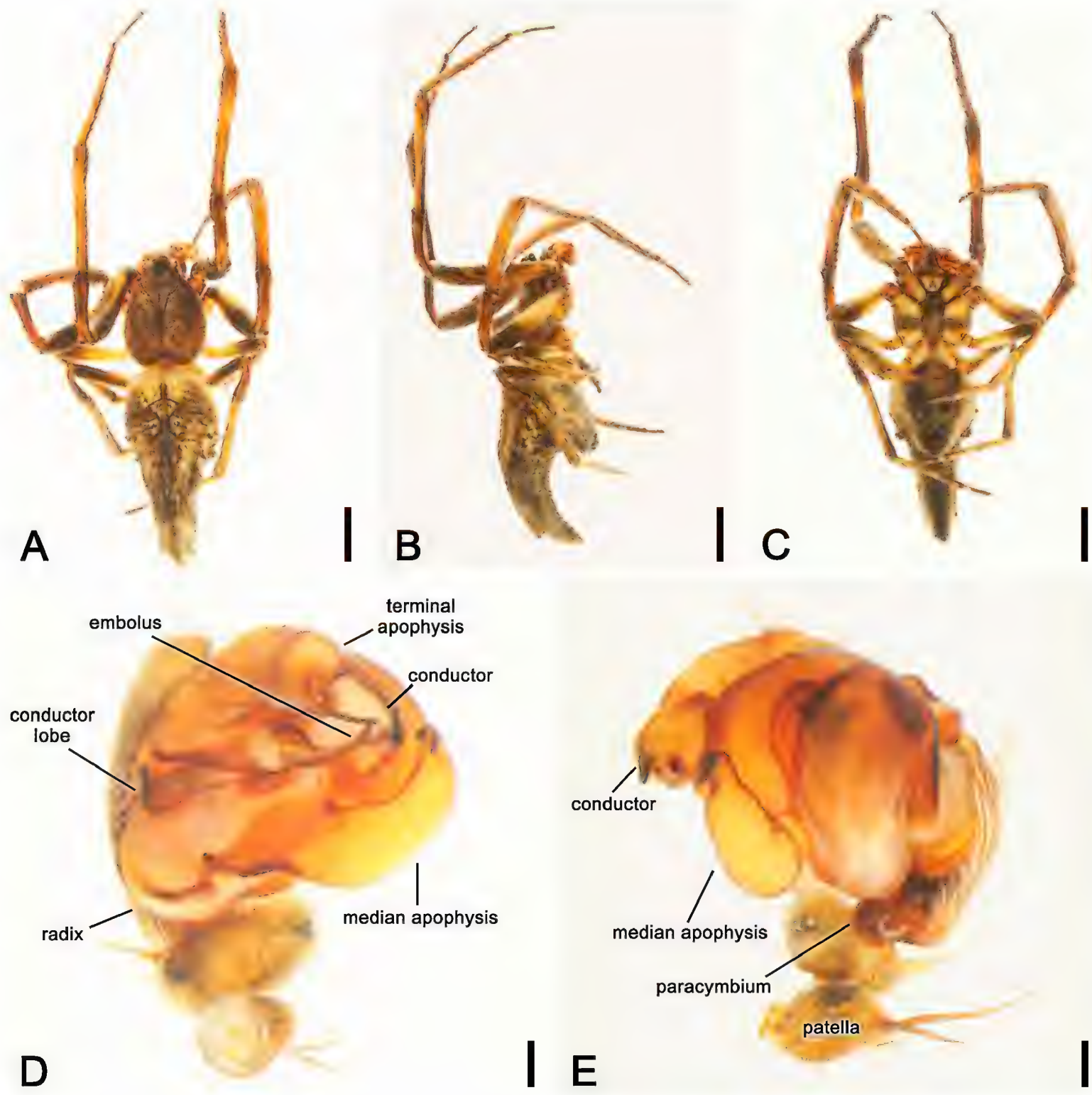

Figure 9. *Hortophora cucullus* sp. nov., male holotype (SAM NN19582). **A.** dorsal habitus; **B.** lateral habitus; **C.** ventral habitus; **D.** left pedipalp, ventral view; **E.** left pedipalp, dorsal view. Scale bars: 2 mm (**A–C**); 0.2 mm (**D, E**).

0.94 long, 1.26 wide, dark brown; endites reddish-brown (Fig. 10B). Sternum 2.7 long, 2.0 wide, dark brown, with white setae particularly along the lateral edges (Fig. 10B). Abdomen 8.8 long, 8.2 wide, with lateral, dorsal and posterior humps, dorsum dark olive-brown, mottled with yellow spots (Fig. 10A); venter olive-brown with lateral rows of white spots (Fig. 10B); Epigyne (Fig. 10C–E) base ovoid; scape highly elongated and centrally slightly wider, short dorsal narrow ridge in basal half (Fig. 10D, E), covered with sparse long setae.

Variation. Size variation: total length males 11.5–12.1 (n=2), females 13.1–17.8 (n=3). Little colour variation has been found within this species, although the abdomen may be a bit darker and less distinctly mottled than in the specimens illustrated here. No case of scape break-off was observed in female *H. cucullus* sp. nov.

Life history and habitat preferences. Mature males of *H. cucullus* sp. nov. were found between April and August suggesting reproductive activity mainly in winter (or the dry season in northern latitudes). Mature females were found between March and November, also suggesting that this species is not reproductively active in summer (or the wet season). The species has generally been found in open forests where the spiders build large orb-webs between shrubs and trees. Like *H. biapicata* sp. nov. it has been found in a variety of climatic conditions, including semi-arid to arid, tropical and temperate regions.

Distribution. *Hortophora cucullus* sp. nov. has been found throughout all mainland states of Australia, except in the south-eastern states of New South Wales and Victoria. The species has not been found in Tasmania (Fig. 11).

Hortophora lodicula (Keyserling, 1887), comb. nov.

Figs 2C, 12–14

Epeira lodicula Keyserling 1887: 159–160, pl. 13, figs 4, 4a.

Epeira scutigerens Hogg 1900: 100–102, pl. 15, figs 2, 2a–d. **New synonymy**.

Araneus lodiculus (Keyserling).- Rainbow 1911: 188.

Araneus scutigerens (Hogg).- Rainbow 1911: 192.

Type material. ***Holotype*** of *Epeira lodicula* Keyserling, 1887: Female, Sydney (33°52'S, 151°12'E, New South

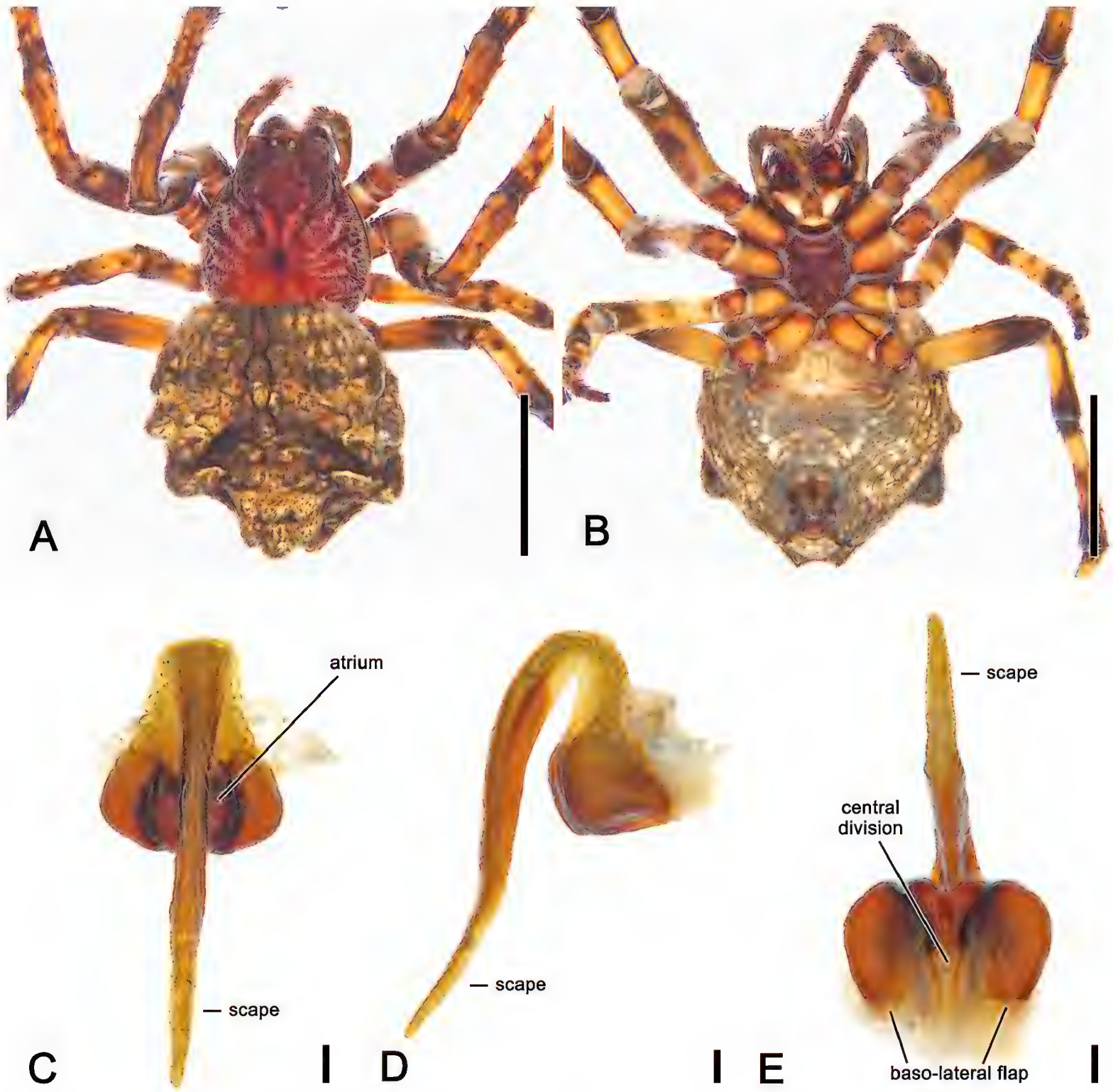

Figure 10. *Hortophora cucullus* sp. nov., female (WAM T70164). **A.** dorsal habitus; **B.** ventral habitus; **C.** epigyne, ventral view; **D.** epigyne, lateral view; **E.** epigyne, posterior view. Scale bars: 2 mm (**A, B**); 0.2 mm (**C–E**).

Wales, Australia), ZMH (Rack (1961)-catalogue No. 248). Examined.

Syntypes of *Epeira scutigerens* Hogg, 1900: 1 male, 1 female, Macedon (37°25'S, 144°33'E Victoria, Australia (NHM 1907.2.24.20–21). Examined.

Other material examined. See Appendix 1.

Diagnosis. The median apophysis of the pedipalp of male of *H. lodicula* comb. nov. is most similar to that of *H. walesiana* comb. nov. due to a broad apical lobe (Figs 12C, 30C), but distinctly differs due to the absence of a conspicuous bubble-shaped terminal apophysis and the presence of a tegular lobe (Fig. 12C, D). Females of *H. lodicula* comb. nov. are most similar to those of *H. yesabah* sp. nov. due to a comparatively short scape (Figs 13C, D, 34C, D). However, *H. lodicula* comb. nov. differs distinctly by the much narrower subtriangular base of the scape (Fig. 13C).

Description. Male (QM S116469): Total length 7.5. Carapace 3.9 long, 3.3 wide; orange-brown, cephalic area somewhat lighter (Fig. 12A). Eye diameter AME 0.25, ALE 0.13, PME 0.18, PLE 0.13; row of eyes: AME 0.77, PME 0.58, PLE 2.20. Chelicerae yellowish-brown; three promarginal teeth (similar size) and two retromarginal teeth (apical larger and on a ridge). Legs orange-brown, basally lighter on femora (Fig. 12A, B). Tibiae of leg II with very elongated and thickened setae and a relatively short and curved apico-ventral megaspur and spine (Fig. 2C). Leg formula I > IV > II > III; length of segments (femur + patella + tibia + metatarsus + tarsus = total length): I – 5.4 + 2.6 + 4.3 + 3.7 + 1.7 = 17.7, II – 4.7 + 2.0 + 3.2 + 0.9 + 1.4 = 12.2, III – 3.5 + 1.4 + 2.0 + 1.9 + 0.9 = 9.7, IV – 3.8 + 1.9 + 2.9 + 3.0 + 1.2 = 12.8. Labium 0.54 long, 0.67 wide, brown, endites brown (Fig. 12B). Sternum 1.4 long, 1.0 wide, yellowish-brown, somewhat darker along the edge (Fig. 12B). Abdomen 3.6 long, 2.7 wide; no humeral humps but with distinct posterior tip; colour pattern poorly preserved (Fig. 12A); dorsum greyish-brown with indistinct darker median marking, venter greyish-brown with indistinct lighter lateral lines (Fig. 12A, B). Pedipalp length (femur + patella + tibia + cymbium = total length): 0.8 + 0.5 + 0.4 + 1.8 = 3.5; paracymbium elongated with rounded tip (Fig. 12D); tegulum with conspicuously pronounced tegular protrusion (Fig. 12 D); median apophysis elongated with a blunt terminal lobe pointing apically

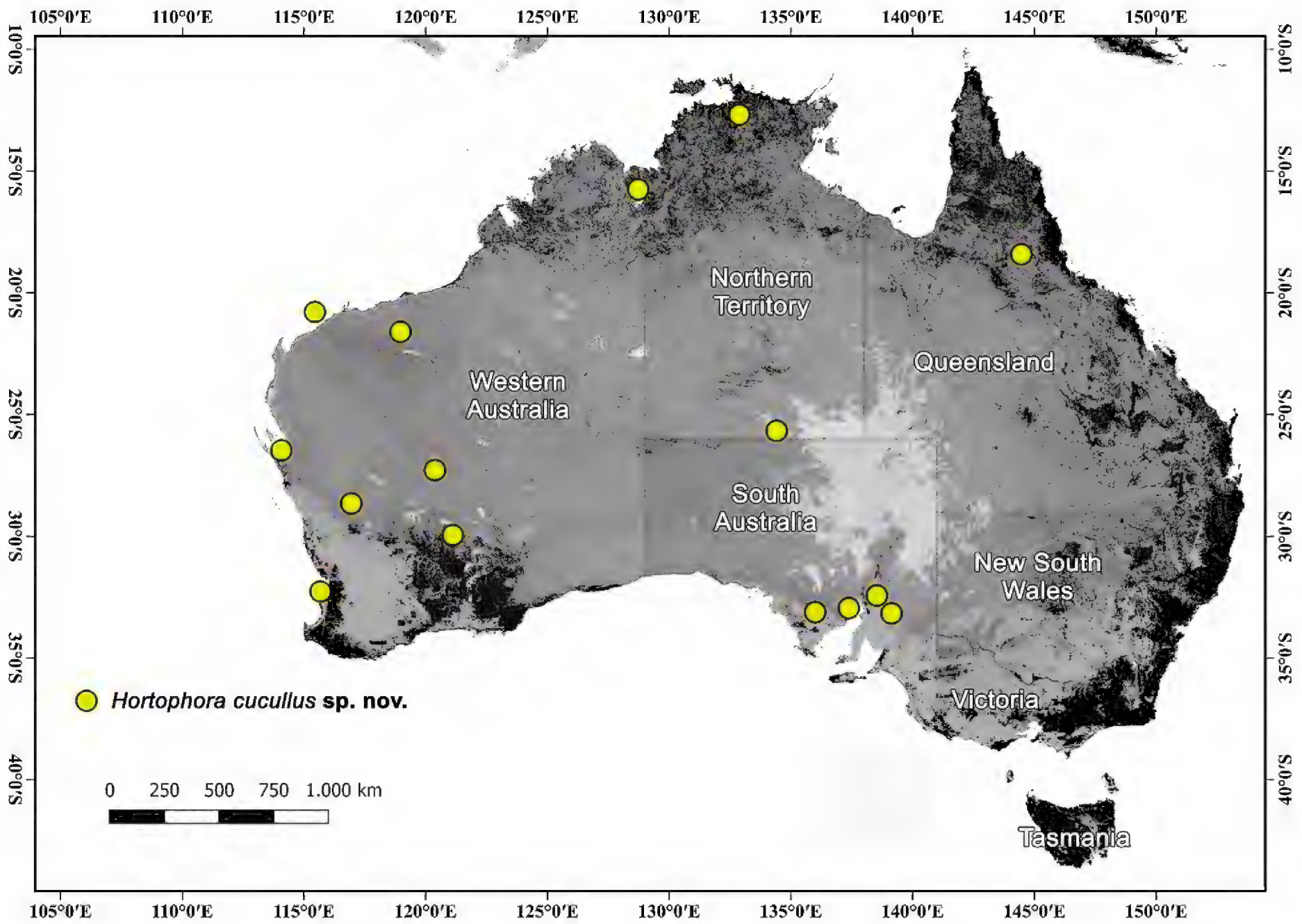

Figure 11. Distribution records of *Hortophora cucullus* sp. nov. in Australia.

(Fig. 12C); conductor lobe not conspicuous (Fig. 12C); terminal apophysis elongate, not bubble-shaped, with pointed tip (Fig. 12C); conductor sclerotised apically and basally, with lamellar central section (Fig. 12C); embolus heavily sclerotized and sinuous (Fig. 12C).

Female (QM S31030): Total length 15.5. Carapace 5.9 long, 4.8 wide; reddish-brown with darker flanks, distinct cover of white setae in cephalic area (Fig. 13A). Eye diameter AME 0.32, ALE 0.16, PME 0.23, PLE 0.16; row of eyes: AME 0.77, PME 0.59, PLE 2.75. Chelicerae reddish-brown; four promarginal teeth (apical and third largest) and three retromarginal teeth (similar size) (Fig. 13B). Legs light brown with some darker discolourations (Fig. 13A, B). Pedipalp length of segments (femur + patella + tibia + tarsus = total length): 1.3 + 0.8 + 1.1 + 2.0 = 5.2. Leg formula I > IV > II > III; length of segments (femur + patella + tibia + metatarsus + tarsus = total length): I – 5.3 + 2.9 + 4.2 + 4.8 + 1.6 = 18.8, II – 5.0 + 2.8 + 4.2 + 0.9 + 1.5 = 14.4, III – 3.7 + 1.8 + 2.1 + 2.0 + 0.8 = 10.4, IV – 4.7 + 2.2 + 3.7 + 4.0 + 1.4 = 16.0. Labium 0.90 long, 1.15 wide, brown; endites brown (Fig. 13B). Sternum 2.8 long, 2.5 wide, brown, with few white setae anteriorly (Fig. 13B). Abdomen 10.0 long, 9.8 wide; very indistinct humeral humps, olive-grey folium pattern and dark lanceolate median band, mottled yellowish to white (Fig. 13A); venter light olive-brown with light lateral bands that are widening posteriorly (Fig. 13B). Epigyne (Fig. 13C–E) almost hexagonal, with subtriangular borders and heart-shaped atrium; central division parallel-sided; scape with triangular basis, just reaching posteriorly beyond epigyne and with sparse setae.

Variation. Size variation: total length males 7.5–10.6 (n=4), females 9.6–16.3 (n=9). The scape of the epigyne was not broken off in any females examined. Like other *Hortophora* gen. nov. species, the abdomen can be variable within the general folium pattern, and white guanine spots or lines are not uncommon. For example, the female syntype of *E. scutigerens* has a strong median guanine line along its whole abdomen (examined).

Remarks. The NHM holds a further female of *H. lodicula* comb. nov. collected in Sydney that is, based on the registration number (NHM 1890.7.1.4193), part of the Keyserling collection that was purchased by that institute (J. Beccaloni, pers. com. to VWF). Keyserling (1887) clearly described the species based on a single holotype female and it is not necessarily clear if the female in the ZMH or NHM is the holotype. Both match the description of Keyserling (1887). We here follow Rack (1961) who considered the ZMH specimen the holotype of *E. lodicula*.

The male and female syntypes of *Epeira scutigerens* Hogg, 1900 match in somatic and genitalic characters the diagnostic characters of *H. lodicula* comb. nov. and the species is therefore proposed as junior synonym of *H. lodicula* comb. nov.

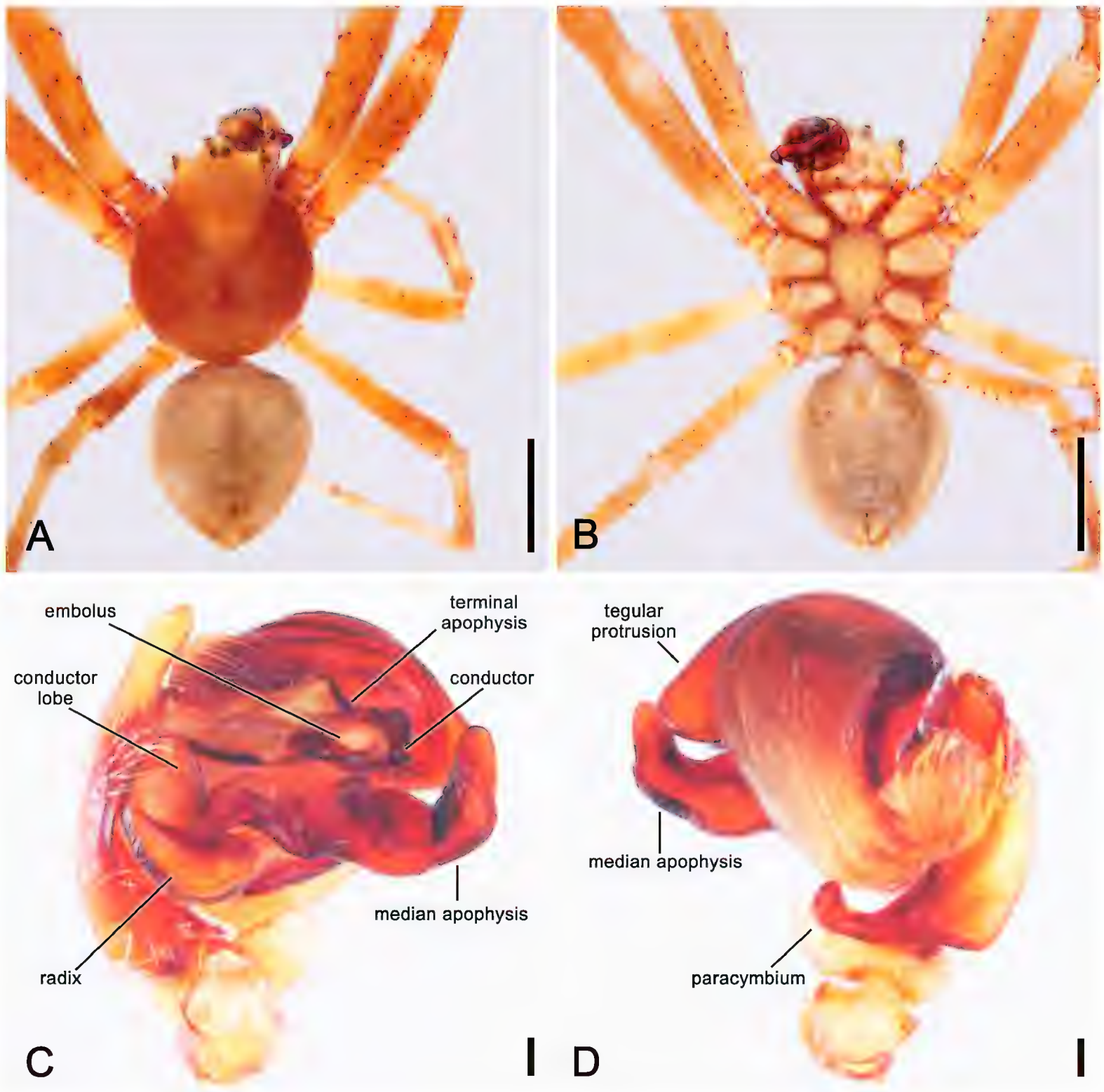

Figure 12. *Hortophora lodicula* comb. nov., male (QM S116469). **A.** dorsal habitus; **B.** ventral habitus; **C.** left pedipalp, ventral view; **D.** left pedipalp, dorsal view. Scale bars: 2 mm (**A, B**); 0.2 mm (**C, D**).

Life history and habitat preferences. Mature males of *H. lodicula* comb. nov. have exclusively been found between January and April, suggesting this species to be summer- to autumn-mature. This matches the female phenology, as females appear somewhat earlier in the season, from November, and can be found into May. There is very little habitat information with specimens in collections, and these point to *H. lodicula* comb. nov. to inhabit open forests, including "amongst Proteas".

Distribution. *Hortophora lodicula* comb. nov. is an eastern Australian species and occurs east and west of the Great Dividing Range from south of ca. 23°50'S Latitude in Queensland south into Tasmania (Fig. 14).

Hortophora megacantha Framenau & Castanheira sp. nov.

http://zoobank.org/69AC16B8-2527-480D-AD11-C0781137C67C

Figs 2D, 4, 15–17

Type material. ***Holotype*** male, Enterprise Mine, North Stradbroke Island (27°33'37"S, 153°27'06"E, Queensland, Australia), QM Party, 8 January 2002, Blackbutt #2 (QM S116474).

Etymology. The specific epithet is a compound noun in apposition derived from the Ancient Greek mega (μέγας) – great, and acantha (Ἀκάνθα) – thorn, and refers to the large megaspur and spine on tibia of leg II in males.

Other material examined. See Appendix 1.

Diagnosis. Males of *Hortophora megacantha* sp. nov. can be easily distinguished from all *Hortophora* by the presence of a large apico-ventral megaspur on the tibia of the second leg that is armed with a strong spine (Fig. 2D). Females of *H. megacantha* sp. nov. are most similar to those of *H. tatianeae* sp. nov., however, *H. megacantha* sp. nov. is identified by the much narrower atrium of the epigyne, specifically visible in posterior view (Fig. 16E vs Fig. 22E). In addition, the scape of *H. megacantha* sp. nov. is much more wrinkled than in *H. tatianeae* sp. nov. (Fig. 16C).

Description. Male (holotype, QM S116474): Total length 7.1. Carapace 3.5 long, 2.8 wide, orange-brown, slightly darker along borders (Fig. 15A). Eye diameter AME 0.27, ALE 0.13, PME 0.18, PLE 0.13; row of eyes: AME 0.65, PME 0.54, PLE 1.60. Chelicerae

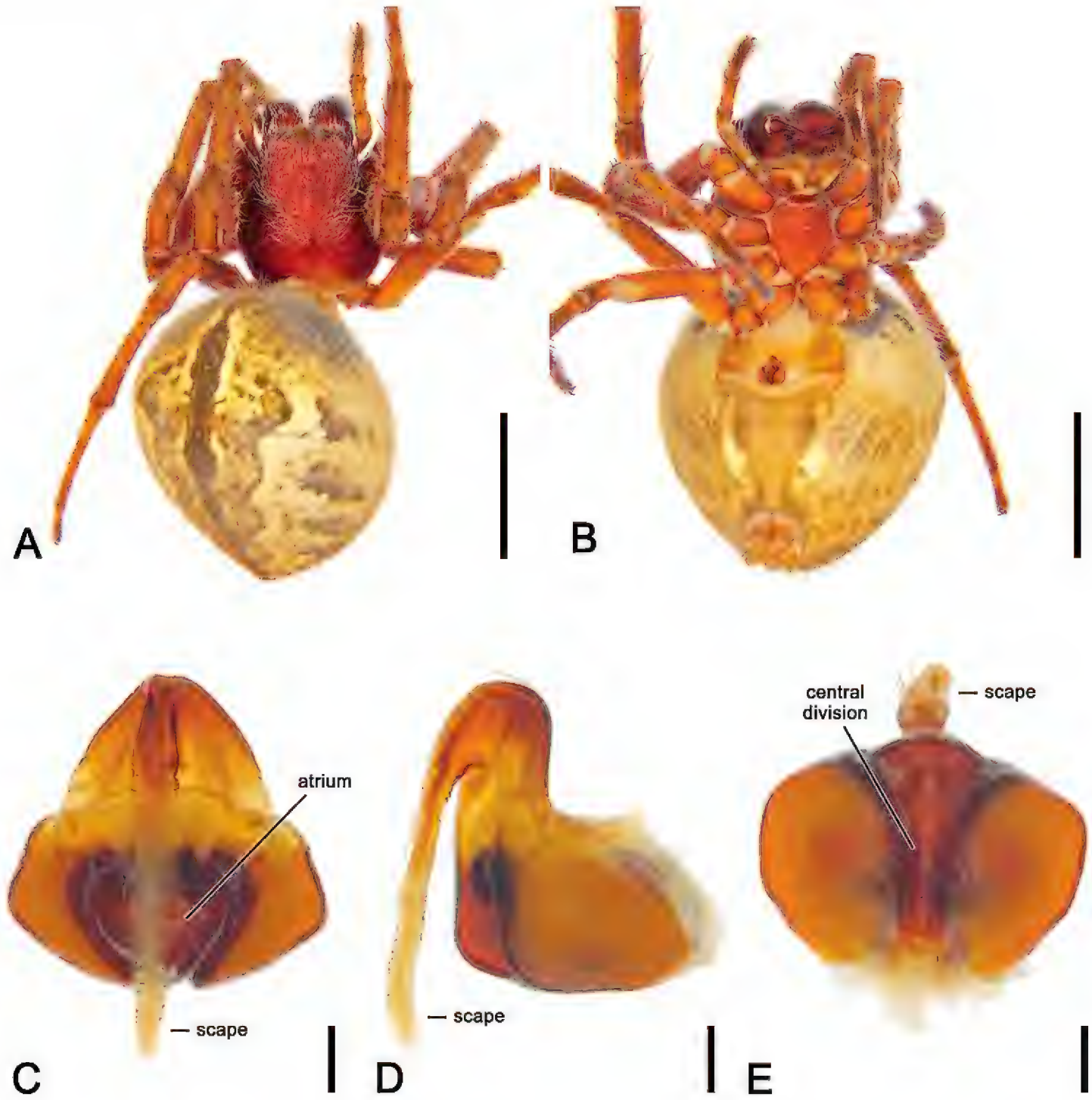

Figure 13. *Hortophora lodicula* comb. nov., female (QM S31030). **A.** dorsal habitus; **B.** ventral habitus; **C.** epigyne, ventral view; **D.** epigyne, lateral view; **E.** epigyne, posterior view. Scale bars: 5 mm (**A, B**); 0.2 mm (**C–E**).

brown; four promarginal teeth (third largest), and four retromarginal teeth on left chelicera (three on the right; basal tooth largest in both sides). Legs brown, femora basally light (Fig. 15A, B). Tibia of leg II with strong apico-ventral megaspur that is armed with a strong spine (QM S116493; Fig. 2D). Metatarsus of leg II strongly bent ventrally in basal half (Fig. 2D). Leg formula I > IV > II > III; length of segments (femur + patella + tibia + metatarsus + tarsus = total length): I – 4.1 + 1.9 + 3.5 + 3.0 + 1.2 = 13.7, II – 3.6 + 1.5 + 2.3 + 0.9 + 1.2 = 9.5, III – 2.5 + 1.0 + 1.2 + 1.3 + 0.7 = 6.7, IV – 3.3 + 1.5 + 2.1 + 2.5 + 1.0 = 10.4. Labium 0.45 long, 0.58 wide, reddish-brown; endites yellowish-brown (Fig. 15B). Sternum 1.5 long, 1.1 wide, light brown, with somewhat greyish shade (Fig. 15B). Abdomen 3.8 long, 3.2 wide, dorsum with distinct humeral humps, distinct folium pattern of olive-grey, mottled white (Fig. 15A; venter olive-brown, with two parallel dusky and two white lateral lines (Fig. 15B). Pedipalp length of segments (femur + patella + tibia + cymbium = total length): 0.6 + 0.4 + 0.3 + 1.2 = 2.5; paracymbium elongated with rounded tip (Figs 4A–C, 15C, D); median apophysis transverse elongate, with greatly enlarged arch over the radix and terminating in two tips with a smaller hump basal of those (Figs 4A–C, 15C, D); conductor lobe of standard size (Figs 4C, 15C); terminal apophysis elongate and not inflated, ventrally projected to an elongated, thin and acute tip (Figs 4A–C, 15C, D); conductor well-developed, subquadrate, flattened and bearing an sclerotized and dented ventral border (Figs 4A, B, 15C, D); embolus sinuous and sclerotized, with a broad and well-developed basis, thick and elongated (Figs 4A–C, 15C).

Female (QM S116473): Total length 8.9. Carapace 3.9 long, 3.5 wide, brown, laterally darker and with white setae in cephalic area (Fig. 16A); chelicerae reddish-brown; four promarginal teeth (third largest) and three promarginal teeth (similar size). Eye diameter AME 0.23, ALE 0.14, PME 0.20, PLE 0.14; row of eyes: AME 0.67, PME 0.59, PLE 2.20. Legs light brow with some darker discolourations, specifically on femora (Fig. 16A, B). Pedipalp length of segments (femur + patella + tibia + tarsus = total length): 1.3 + 0.6 + 0.7 + 1.4 = 4.0. Leg formula I > IV > II > III; length of segments (femur + patella + tibia + metatarsus + tarsus = total length): I – 4.2 + 1.9 + 3.3 + 3.1 + 1.2 = 13.7, II – 3.7 + 1.9 + 2.9 + 0.9 + 1.1 = 10.5, III – 2.3 + 1.2 + 1.4 + 1.4 + 0.9 = 7.2, IV – 3.5 + 1.6 + 2.1 + 2.5 + 1.0 = 10.7. Labium 0.68 long, 0.86 wide, colouration as in male; endites as in male (Fig. 16B). Sternum 1.9 long, 1.7 wide, orange-brown with sparse white setae

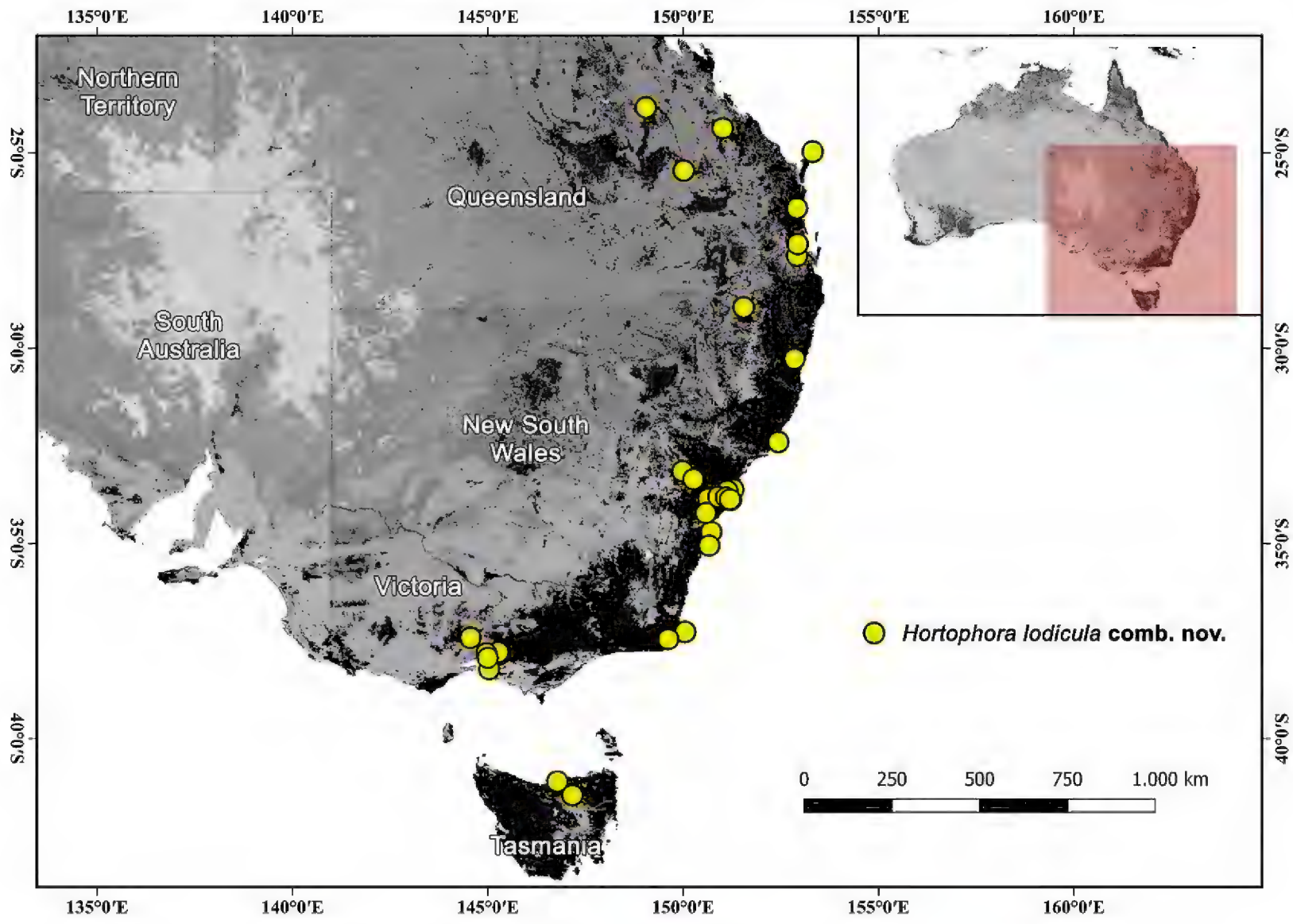

Figure 14. Distribution records of *Hortophora lodicula* comb. nov. in Australia.

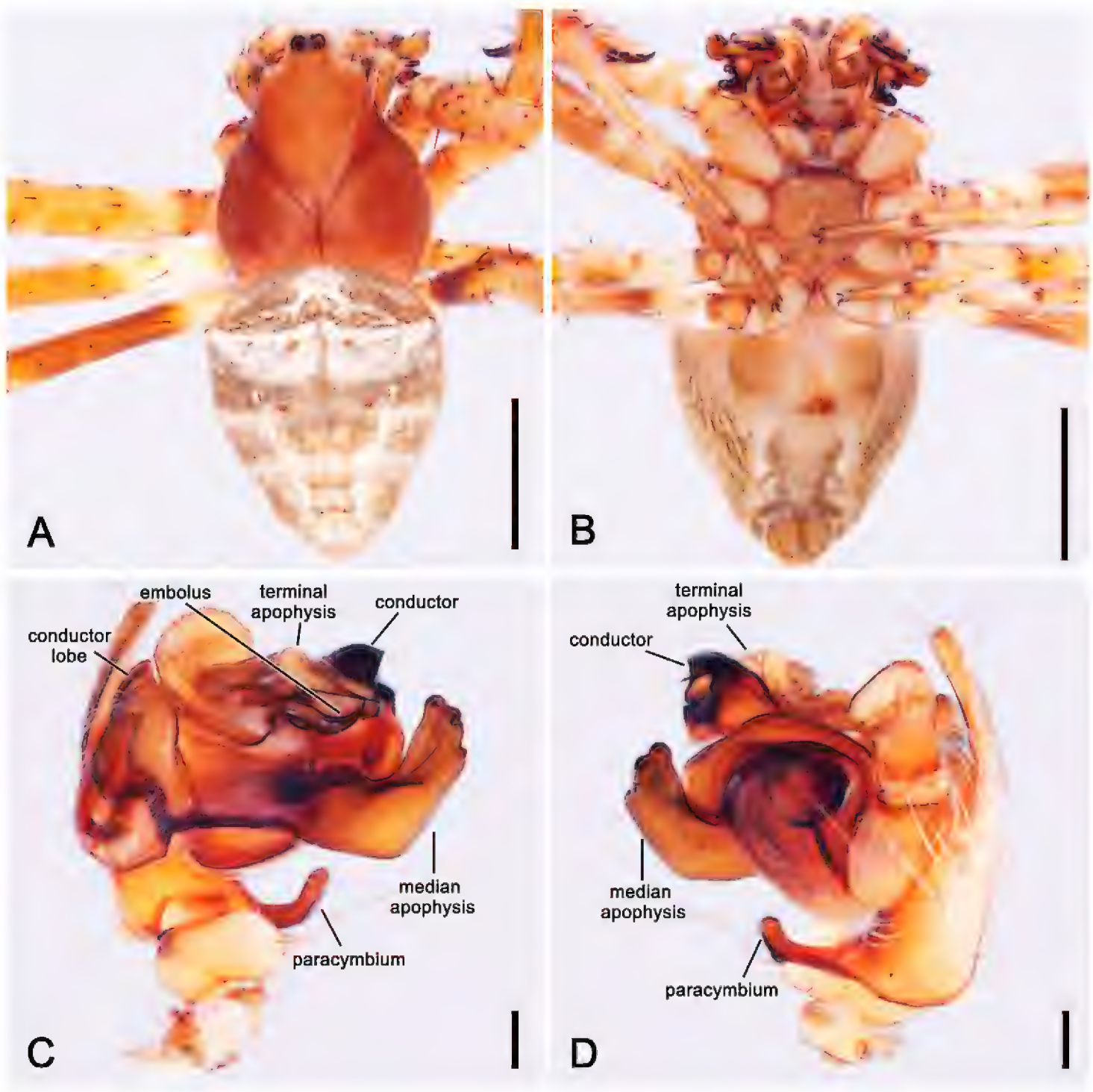

Figure 15. *Hortophora megacantha* sp. nov., male holotype (QM S116474). **A.** dorsal habitus; **B.** ventral habitus; **C.** left pedipalp, ventral view; **D.** left pedipalp, dorsal view. Scale bars: 2 mm (**A, B**); 0.2 mm (**C**, **D**).

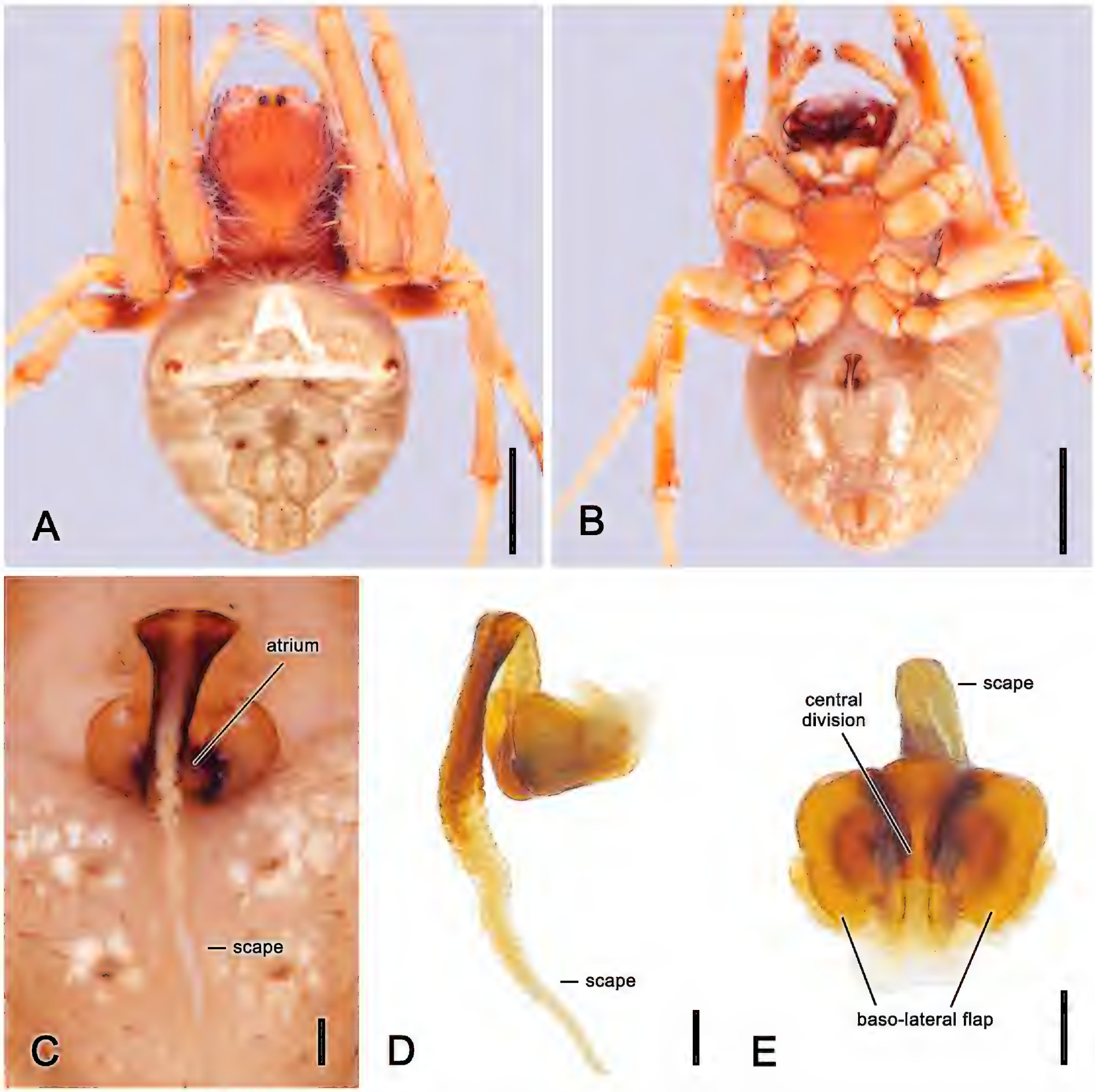

Figure 16. *Hortophora megacantha* sp. nov., female (QM S116473). **A.** dorsal habitus; **B.** ventral habitus; **C.** epigyne, ventral view; **D.** epigyne, lateral view; **E.** epigyne, posterior view. Scale bars: 2 mm (**A, B**); 0.2 mm (**C–E**).

(Fig. 16B). Abdomen 4.7 long, 4.1 wide, folium colouration as in male (Fig. 16B). Epigyne (Fig. 16C–E) wider than long with small atrium; scape elongated, anteriorly heavily sclerotized, basally wide and tapering from its first third to a thin and pointed less sclerotized tip, wrinkled and with sparse setae.

Variation. Size variation: total length males 5.6–7.5 (n=11), females 6.3–9.9 (n=16). The incidence of epigyne break-off was high in this species (ca. 75%), as only four of the 16 females measured had an intact scape. Colour pattern of the preserved specimens was fairly uniform as here described for the male and female with little major variation. Guanine patterns are prominent mainly in the anterior parts of the abdomen in some species.

Life history and habitat preferences. Mature males and females of *H. megacantha* sp. nov. can generally be found between November and February, with single records of males in April and September and a few records of females in April. Therefore, the species appears to be largely summer-mature. The species was found in a variety of forests and bushlands, including those with Blackbutt (*Eucalyptus pilularis*), and in vine thickets. Other habitat descriptions include mallee, scrubby gully and softwood scrub.

Distribution. *Hortophora megacantha* sp. nov. has been found east and west of the Great Dividing Range from northern Queensland to central New South Wales (Fig. 17).

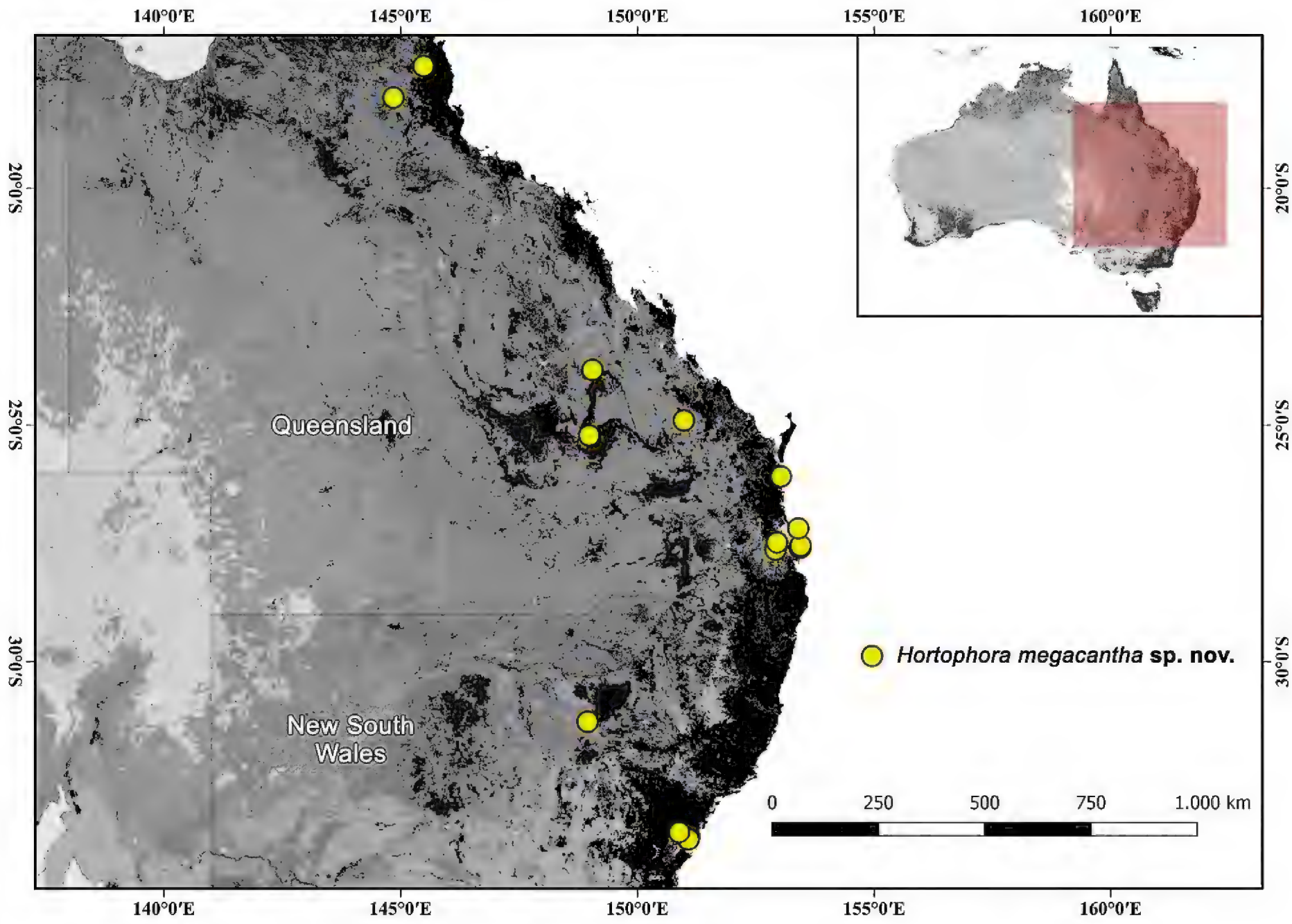

Figure 17. Distribution records of *Hortophora megacantha* sp. nov. in Australia.

Hortophora porongurup Framenau & Castanheira, sp. nov.

http://zoobank.org/00CB03F4-29D7-4CC8-94C6-9BF8A4F3AB4C

Figs 2F, 18–21

Eriophora sp. NGEN01 64: Scharff et al. 2020, 5, fig. 3.

Type material. ***Holotype*** male, Porongurup National Park, S end of Millinup Pass (34°42'S, 117°54'E, Western Australia, Australia), M. S. Harvey, J. M. Waldock, 30 March 1993 (WAM T155065).

Etymology. The specific epithet is a noun in apposition derived from the type locality, Porongurup National Park.

Other material examined. See Appendix 1.

Diagnosis. Males of *H. porongurup* sp. nov. are easily identified by the extremely elongated median apophysis of the male pedipalp that reaches far beyond the pedipalp contour (Fig. 18C, D), unlike in any other *Hortophora* gen. nov. males. Similarly, females of *H. porongurup* sp. nov. are unlike any other species in the genus and can be distinguished from all other *Hortophora* gen. nov. by the thick and rounded lateral borders of the epigyne and an extremely wide central division (Fig. 19C, E). The central division is much narrower in all other *Hortophora* gen. nov. species.

Description. Male (holotype, WAM T155065): Total length: 5.9. Carapace 3.0 long, 2.4 wide; yellow-brown with irregular darker discolourations (Fig. 18A). Eye diameter AME 0.14, ALE 0.09, PME 0.11, PLE 0.09; row of eyes: AME 0.54, PME 0.38, PLE 1.35. Chelicerae yellowish-brown; four promarginal teeth (apical and third largest) and three retromarginal teeth (similar size). Legs yellow-brown with dark brown patches on joints, patellae, tibiae and metatarsi, especially on legs III and IV (Fig. 18A, B). Tibiae of leg II with elongated strong setae but without megaspur (Fig. 2E). Leg formula I > IV > II > III; length of segments (femur + patella + tibia + metatarsus + tarsus = total length): I – 2.9 + 1.3 + 2.5 + 1.9 + 0.8 = 9.4, II – 2.5 + 1.2 + 2.0 + 0.9 + 0.6 = 7.2, III – 2.0 + 0.7 + 1.1 + 1.0 + 0.5 = 5.3, IV – 2.7 + 1.0 + 1.7 + 1.7 + 0.7 = 7.8. Labium 0.38 long, 0.54 wide, yellowish-brown; endites yellow-brown (Fig. 18B). Sternum 1.3 long, 0.9 wide, yellow-brown with dusky patches (Fig. 18B). Abdomen 3.0 long, 2.4 wide; dorsum with indistinct humeral humps and pointed posterior end, olive-grey with distinct folium pattern and dark central line (Fig. 18A); venter olive-grey with two indistinct large light patches mainly in posterior half (Fig. 18B). Pedipalp length of segments (femur + patella + tibia + cymbium = total length): 0.7 + 0.3 + 0.3 + 1.4 = 2.7, paracymbium short and hook-like (Fig. 18D); median apophysis transverse, highly elongated, with two apical tips (Fig. 18C); conductor lobe of standard size; terminal apophysis bubble-shaped and tapering into a short, sclerotised tip (Fig. 18C); conduc-

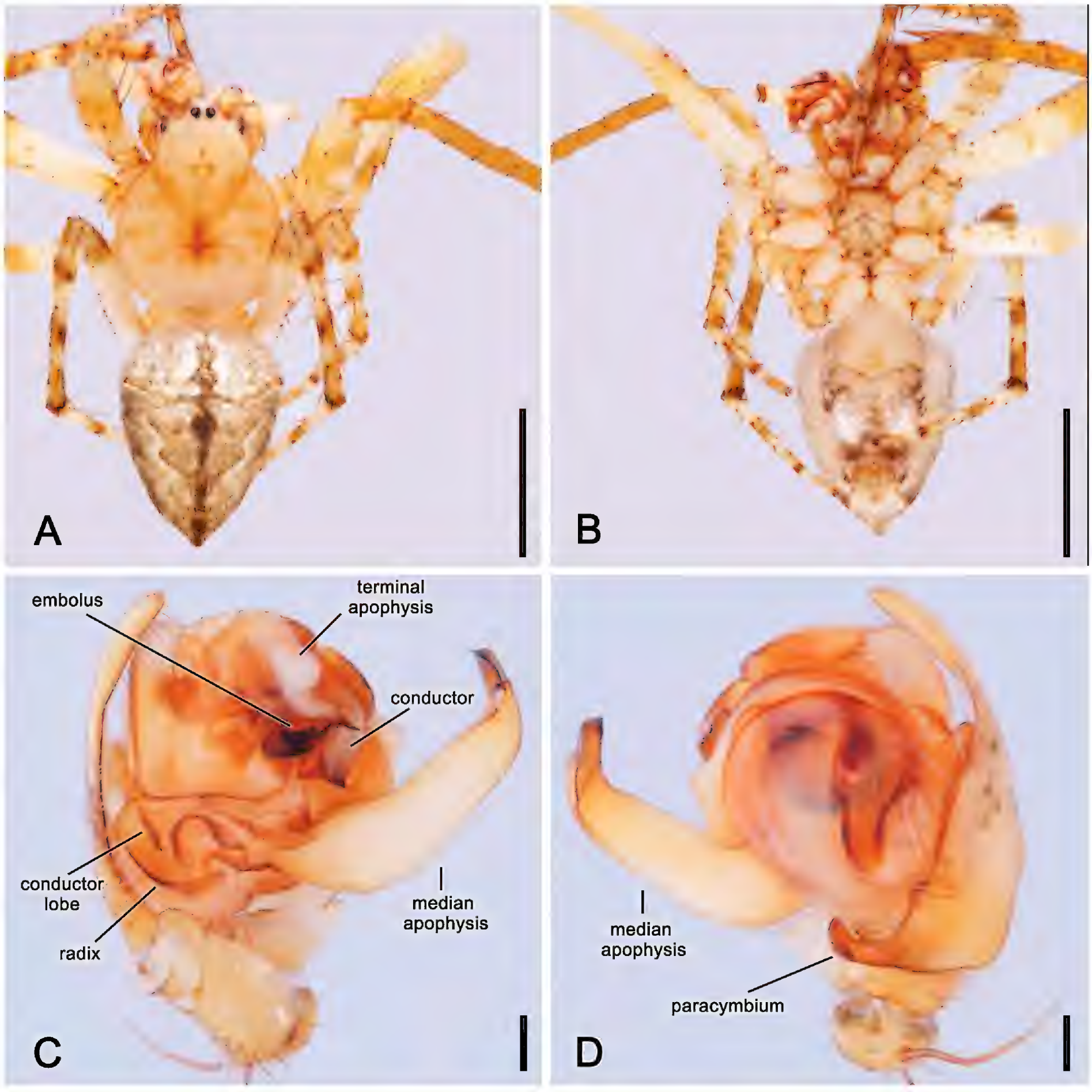

Figure 18. *Hortophora porongurup* sp. nov., male holotype (WAM T155065). **A.** dorsal habitus; **B.** ventral habitus; **C.** left pedipalp, ventral view; **D.** left pedipalp, dorsal view. Scale bars: 2 mm (**A, B**); 0.2 mm (**C, D**).

tor subquadrate, with a sclerotised tip; embolus short and thick (Fig. 18C).

Female (WAM T155066): Total length 7.0. Carapace 2.8 long, 2.2 wide; brown, with darker discolorations (Fig. 19A). Eye diameter AME 0.20, ALE 0.13, PME 0.14, PLE 0.13; row of eyes: AME 0.52, PME 0.43, PLE 1.40. Chelicerae brown; four promarginal teeth (apical and third largest) and three retromarginal teeth (similar size). Legs as in male but somewhat lighter (Fig. 19A, B). Pedipalp length of segments (femur + patella + tibia + tarsus = total length): 0.9 + 0.4 + 0.6 + 1.1 = 3.0. Leg formula I > IV > II > III; and length of segments: I – 2.9 + 1.4 + 2.2 + 2.0 + 0.8 = 9.3, II – 2.6 + 1.2 + 2.0 + 0.9 + 0.7 = 7.4, III – 1.6 + 0.6 + 1.4 + 1.0 + 0.5 = 5.1, IV – 2.4 + 1.0 + 1.7 + 1.8 + 0.7 = 7.6. Labium 0.36 long, 0.63 wide, as in male; endites as in male (Fig. 19B). Sternum 1.4 long, 1.1 wide, colour as in male (Fig. 19B). Abdomen 4.5 long, 3.5 wide; with humeral humps and tip posteriorly, dorsal and ventral colour as in male (Fig. 19A, B). Epigyne (Fig. 19C–E) wider than long, borders thick and rounded, heavily sclerotized; central division wide; and scape with broad basis, but shape unknown as broken off in all examined specimens.

Variation. Size variation: total length males 5.9–6.7 (n=3), females 7.0–8.8 (n=6). The scape of the female epigyne was broken off in all females examined. The folium pattern of *H. porongurup* sp. nov. with a dark central line is fairly consistent between specimens examined by us.

Life history and habitat preferences. Mature males and females of *H. porongurup* sp. nov. have only been found in March and April, suggesting this species to be au-

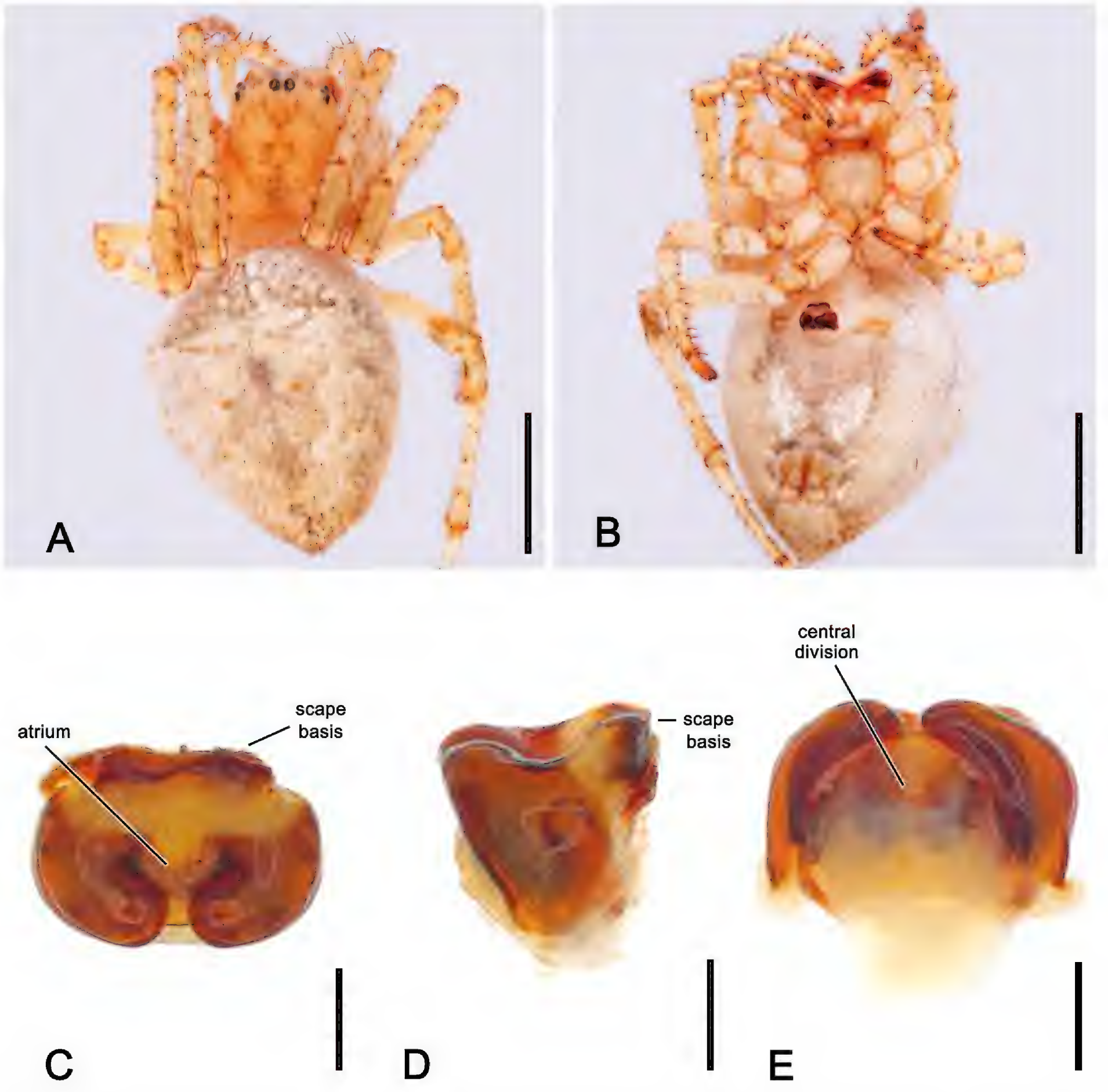

Figure 19. *Hortophora porongurup* sp. nov., female (WAM T155066). **A.** dorsal habitus; **B.** ventral habitus; **C.** epigyne, ventral view; **D.** epigyne, lateral view; **E.** epigyne, posterior view. Scale bars: 2 mm (**A, B**); 0.2 mm (**C–E**).

tumn-mature. Only one specimen vial included a habitat description, which was 'deep gully, in elevated leaf litter'.

Distribution. *Hortophora porongurup* sp. nov. has only been found in southern Western Australia (Fig. 20).

Hortophora tatianeae Framenau & Castanheira sp. nov.

http://zoobank.org/C49FFFC7-8FC4-47CA-8F06-4827E971FBF7

Figs 1D–F, 2G, 21–23

Type material. ***Holotype*** male, Hume St, Ringwood East, unnamed park (37°49'26.88"S, 145°15'31.97"E, Victoria), 7 January 2019, V.W. Framenau, spotlighting (MV K-14612).

Etymology. The specific epithet is a matronym in apposition honouring Tatiane Almeida Diorio, wife of one of the junior authors (PSC), for her support during his research career.

Other material examined. See Appendix 1.

Diagnosis. Male and female genital morphology of *H. tatianeae* sp. nov. is most similar to *H. biapicata* comb. nov. and *H. transmarina* comb. nov., but differs from both species in the distinctly different ventral abdomen colouration that lacks the broad transverse light bands (Fig. 1E, 21B, 22B vs 1E, G, 6B, D, F, H, 24B, 25B).

Description. Male (holotype, MV K-14612): Total length 7.8. Carapace 4.5 long, 3.5 wide, centrally beige and with dark brown lateral flanks, white setae partic-

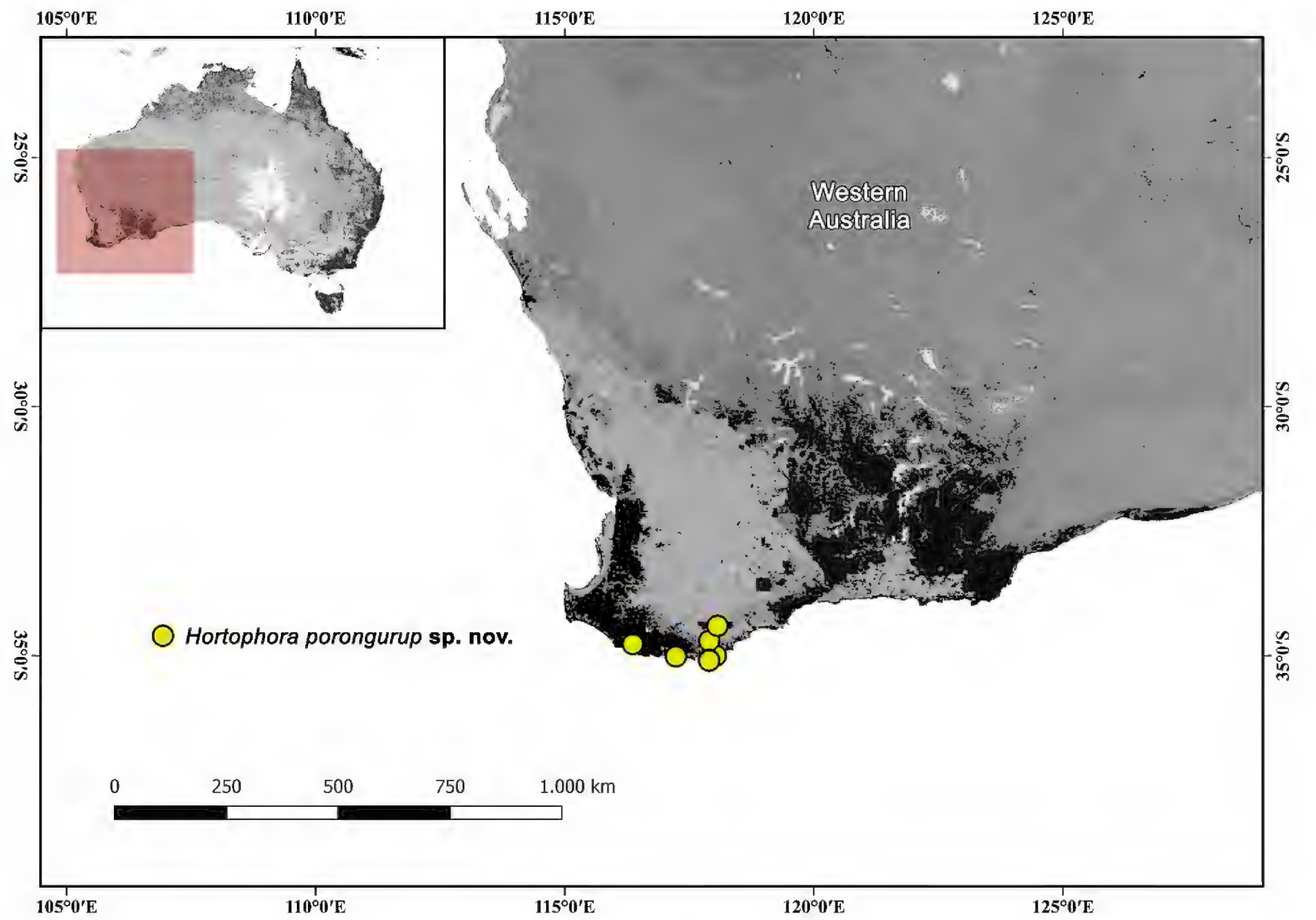

Figure 20. Distribution records of *Hortophora porongurup* sp. nov. in Australia.

ularly centrally (Fig. 21A). Eye diameter AME 0.29, ALE 0.13, PME 0.20, PLE 0.14; row of eyes: AME 0.68, PME 0.47, PLE 1.66. Chelicerae dark brown, three promarginal teeth widely separated on sclerotised irregular ridge, three retromarginal teeth of same size. Legs dark brown with light discolourations, particularly basally on all femora and hooks on coxae I (Fig. 21A, B). Tibiae of leg II enlarged with apico-ventral megaspur that carries a strong spine, additional strong spines ventrally and prolaterally (Fig. 2G). Metatarsus of leg II heavily bent (Fig. 2F). Leg formula I > IV > II > III; length of segments (femur + patella + tibia + metatarsus + tarsus = total length): I – 4.7 + 1.9 + 4.0 + 3.4 + 1.1 = 15.1, II – 3.9 + 1.8 + 3.3 + 0.9 + 1.0 = 10.9, III – 2.8 + 1.1 + 1.8 + 1.7 + 0.8 = 8.2, IV – 3.5 + 1.4 + 2.8 + 2.7 + 1.0 = 11.4. Labium 0.45 long, 0.72 wide, dark brown, endites dark brown (Fig. 21B). Sternum 1.8 long, 1.3 wide, brown, with darker discolorations (Fig. 21B). Abdomen 4.0 long, 2.8 wide, dorsum with humeral humps, dark brown folium pattern and central white guanine patches (Fig. 21A); venter olive-brown with two white lateral lines and ca. four pairs of white spots centrally (Fig. 21B). Pedipalp length of segments (femur + patella + tibia + cymbium = total length): 0.5 + 0.4 + 0.3 + 1.9 = 3.1; paracymbium elongated with terminal hook (Figs 3C, 21D); median apophysis transverse elongate with central pointy protrusion and terminating in two sclerotized apical tips (Figs 3C, 21C); conductor lobe of standard size (Figs 3C, 21C); terminal apophysis bubble-shaped tapering into a short sclerotised tip (Figs 3C, 21C); conductor apically and basally sclerotised and with a lamellar, excavated central portion (Figs 3C, 21C); embolus sinuous with acute tip (Figs 3C, 21C).

Female (MV K-14613): Total length 10.1. Carapace 4.5 long, 3.9 wide; reddish-brown with darker lateral flanks (Fig. 22A). Eye diameter AME 0.22, ALE 0.14, PME 0.15, PLE 0.14; row of eyes: AME 0.68, PME 0.50, PLE 2.44. Chelicerae brown, three promarginal teeth (median largest) and three retromarginal teeth (similar size). Legs brown, variously ringed lighter and darker (Fig. 22A, B). Pedipalp length of segments (femur + patella + tibia + tarsus = total length): 1.3 + 0.6 + 0.8 + – + 1.6 = 4.3. Leg formula I > IV > II > III; length of segments (femur + patella + tibia + metatarsus + tarsus = total length): I – 4.4 + 2.5 + 4.2 + 4.1 + 1.4 = 16.6, II – 4.2 + 2.2 + 3.7 + 0.9 + 1.3 = 12.3, III – 3.0 + 1.2 + 1.6 + 1.7 + 0.9 = 8.4, IV – 4.3 + 2.0 + 3.0 + 3.2 + 1.2 = 13.7. Labium 0.81 long, 1.15 wide, as in male; endites as in male (Fig. 22B). Sternum 2.0 long, 1.7 wide, but reddish-brown with dusky markings (Fig. 22B). Abdomen 6.0 long, 4.9 wide; dorsum with indistinct humeral

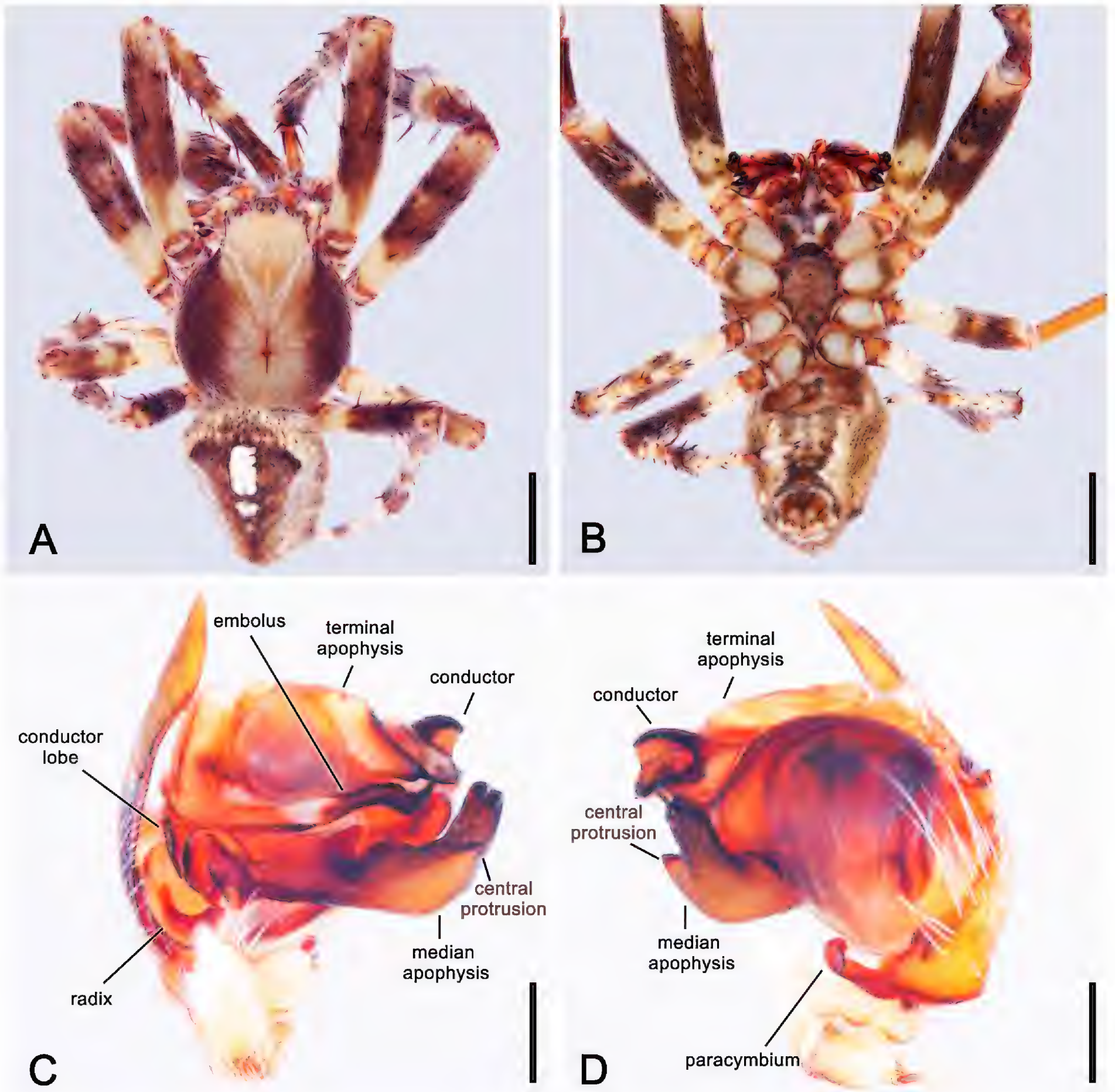

Figure 21. *Hortophora tatianeae* sp. nov., male holotype (MV K-14612). **A.** dorsal habitus; **B.** ventral habitus; **C.** left pedipalp, ventral view; **D.** left pedipalp, dorsal view. Scale bars: 2 mm (**A, B**); 0.5 mm (**C, D**).

humps, olive-grey folium pattern with light lines and patches (Fig. 22A); venter as in male (Fig. 22B). Epigyne (Fig. 22C–E) base about as wide as long in ventral view; scape very elongated, basally with transverse ridge, very sparse setae; central division narrow with parallel sides.

Variation. Size variation: total length males 6.3–11.3 (n=21), females 6.3–14.0 (n=31). There was no incidence of epigyne scape breaking in *H. tatianeae* sp. nov. in any of the specimens examined by us. Dorsal abdominal colour variations are similar to that of *H. biapicata* comb. nov. and *H. transmarina* comb. nov., which range from a fairly uniform light to dark brown colour, faint to distinct folium pattern as described here and variable guanine patterns, as for example in the holotype male (Fig. 1F, 21A).

Life history and habitat preferences. Mature males of *H. tatianeae* sp. nov. have been found from December to April, with a single record in May. Mature females have been found throughout the year, but with very low numbers between June and November. Therefore, the species is largely summer- to autumn mature. Habitat descriptions include open, dry sclerophyll and rainforest, but the species has also been found in urban parks and gardens.

Distribution. *Hortophora tatianeae* sp. nov. has been found along the east coast of Australia, from northern Queensland to Tasmania (Fig. 23).

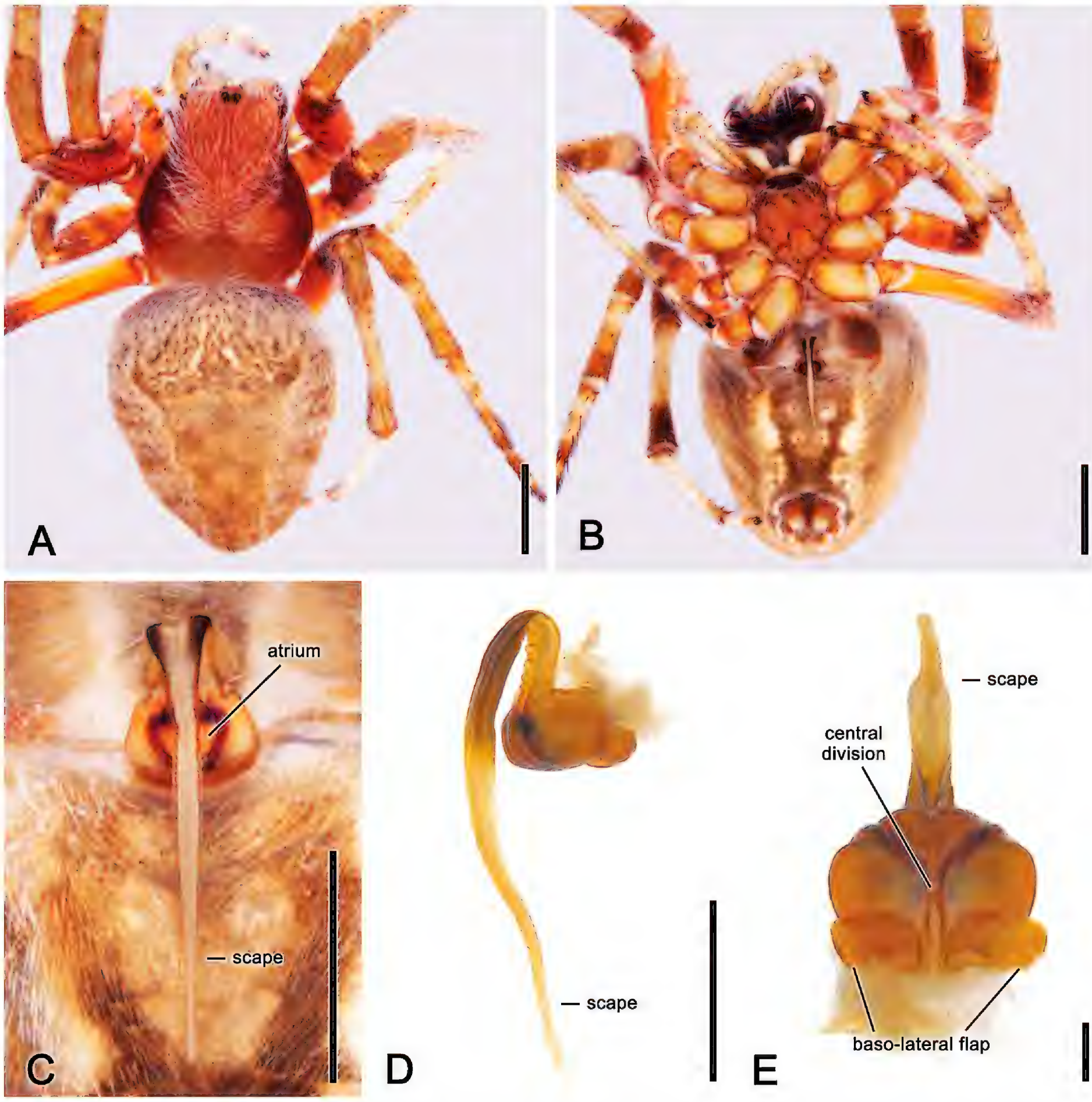

Figure 22. *Hortophora tatianeae* sp. nov., female. **A.** dorsal habitus (MV K-14613); **B.** ventral habitus; **C.** epigyne, ventral view; **D.** epigyne, lateral view; **E.** epigyne, posterior view. Scale bars: 2 mm (**A, B**); 1 mm (**C, D**); 0.2 mm (**E**).

Hortophora transmarina (Keyserling, 1865), comb. nov.

Figs 1G, 2H, 24–26

Epeira transmarina Keyserling 1865: 814–815, plate 18, figs 15–16; Keyserling 1887: 139–141, plate 11, figs. 4, 4a–b.

Epeira producta Koch 1867: 178–180. Koch 1871: 55–58, plate 4, figs 5, 5a, 6, 7, 7a; Thorell 1881: 90–93; Hogg 1899: 139–140, plate 13, figs 4, 4a,b. Synonymy established by Keyserling (1886, p. 141).

Not *Epeira transmarina* Keyserling *sensu* Koch 1871: 59–61, plate 5, figs 2, 2a (misidentification, this is *Backobourkia heroine* (L. Koch, 1871) (see Framenau et al. 2010).

Araneus productus (L. Koch).- Rainbow 1909: 222; Chrysanthus 1960: 30–31, figs 34, 47, 64, 71.

Araneus transmarinus (Keyserling).- Rainbow 1911: 195.

Not *Aranea producta* (L. Koch) *sensu* Strand 1913: 608–609 (misidentification, the specimens are *H. biapicata* comb. nov. based on the descriptions provided by E. Strand and the distribution data, central Australia, where *H. transmarina* comb. nov. does not occur).

Eriophora producta (L. Koch).- Archer, 1951: 21.

Eriophora transmarina (Keyserling).- Archer 1951: 21; Davies 1980: 126–127, figs 1–8, plate I, A–B; Davies 1988: 304, fig. 24.

Araneus transmarinus (Keyserling).- Main 1964: 100, figs B–F.

Not *Eriophora transmarina* (Keyserling) *sensu* Dondale 1966: 1164–1166, figs 2D–G (misidentification, this is *H. biapicata* comb. nov.)

Type material. ***Syntypes*** of *Epeira transmarina* Keyserling, 1865: Based on original description an unknown number of females, New South Wales (no exact locality), Dr Graeffe leg., Museum Godeffroy (today largely in ZMH). Here assumed to be: 8 females, 3 juveniles in the ZMH without locality data and a label: “e Mus. God.; det. Keys.” and a second label handwritten by E. v. Keyser-

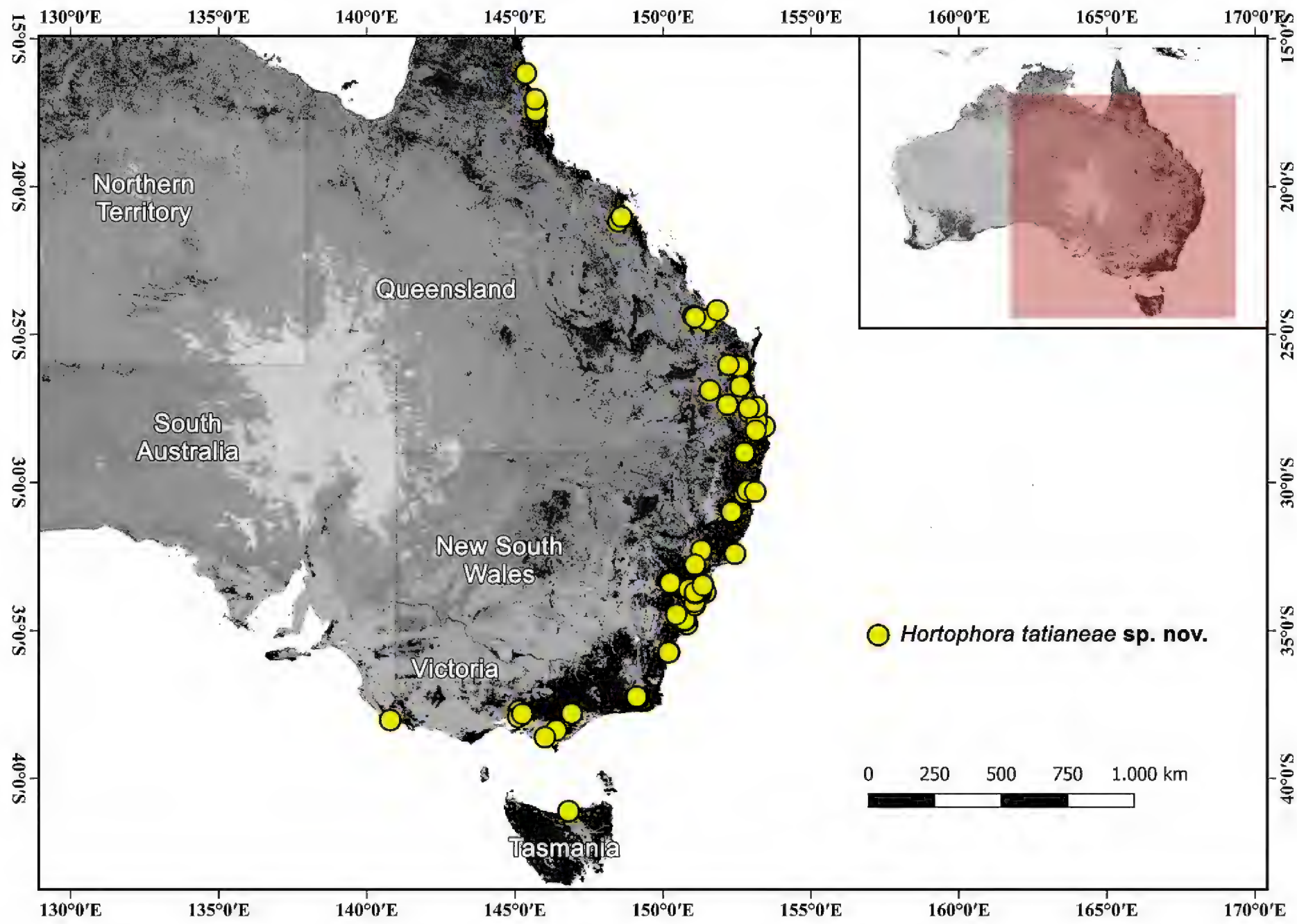

Figure 23. Distribution records of *Hortophora tatianeae* sp. nov. in Australia.

ling "Epeira transmarina Keys. = producta L.K." (ZMH) (2 females in this series are *B. heroine* and 1 female is *H. biapicata* comb. nov.). Examined. 4 mature females, 1 juvenile, Godeffroy collection (labelled with Schmeltz (1866, 1869)-catalog species no. "2286" for *Epeira producta* (NHM). No other specimens examined by us in NHM, ZMH or ZMB match the type data (see Remarks).

Syntypes of *Epeira producta* L. Koch 1871: Based on original description unknown number of mature females ("*Entwickelte Weibchen*"), Brisbane (27°28'S, 153°02'E, Queensland), A. Dietrich leg., Museum Godeffroy (today largely in ZMH). Here assumed to be: 1 female, 3 juveniles, Brisbane (27°28'S, 153°02'E, Queensland) (NHM 1915.3.5.986–989). Examined. 1 juvenile, Brisbane (27°28'S, 153°02'E, Queensland) (ZMH, Rack (1961)-catalogue no. 265). No other specimens examined by us in NHM, ZMH or ZMB match the type data (see Remarks below).

Other material examined. See Appendix 1.

Diagnosis. Males of *H. transmarina* comb. nov. are, due to the ventral colour pattern and similar body-size, most similar to *H. biapicata* comb. nov. However, they differ from those of *H. biapicata* comb. nov. by the absence of coxal hooks on leg II (Fig. 7F). Females of *H. transmarina* comb. nov. are most similar to *H. biapicata* comb. nov.; however, *H. transmarina* comb. nov. can be identified by the much larger baso-lateral flaps, best observed in posterior view (Fig. 25E).

Description. Male (WAM T67597): Total length: 17.3. Carapace 8.5 long, 7.3 wide; orange-brown, head region lighter and covered with yellow setae (Fig. 24A). Eye diameter AME 0.32, ALE 0.20, PME 0.29, PLE 0.18; row of eyes: AME 1.06, PME 0.79, PLE 3.64. Chelicerae orange-brown, two promarginal teeth connected by a sclerotized ridge, and three retromarginal teeth (similar size). Legs orange-brown and covered by strong setae (Fig. 24A, B). Tibiae of leg II bearing conspicuous strong and long setae, but no megaspur (Fig. 2G). Leg formula I > IV > II > III; length of segments (femur + patella + tibia + metatarsus + tarsus = total length): I – 8.6 + 7.0 + 4.5 + 6.7 + 2.1 = 28.9, II – 7.5 + 6.6 + 3.9 + 0.9 + 1.8 = 20.7, III – 5.8 + 3.7 + 2.3 + 3.1 + 1.3 = 16.2, IV – 7.0 + 3.4 + 5.3 + 5.5 + 1.8 = 23.0. Labium 0.86 long, 1.13 wide, dark brown; endites brown (Fig. 24B). Sternum 3.4 long, 2.2 wide, orange-brown and covered by yellowish setae (Fig. 24B). Abdomen 8.3 long, 6.5 wide; dorsum yellow-olive, covered by yellowish setae; venter yellowish brown with broad white banding (Fig. 24B). Pedipalp length of segments (femur + patella + tibia + cymbium = total length): 1.6 + 0.7 + 0.6 + 3.3 = 6.2; paracymbium elongated with curved tip (Fig. 24D); median apophysis elongate and transverse, basally with large arch over radix, a central pointy protrusion and apically divided tips (Fig. 24C); conductor lobe of standard shape and size (Fig. 24C); terminal apophysis bubble-shaped, tapering into an elongated, sclerotised tip

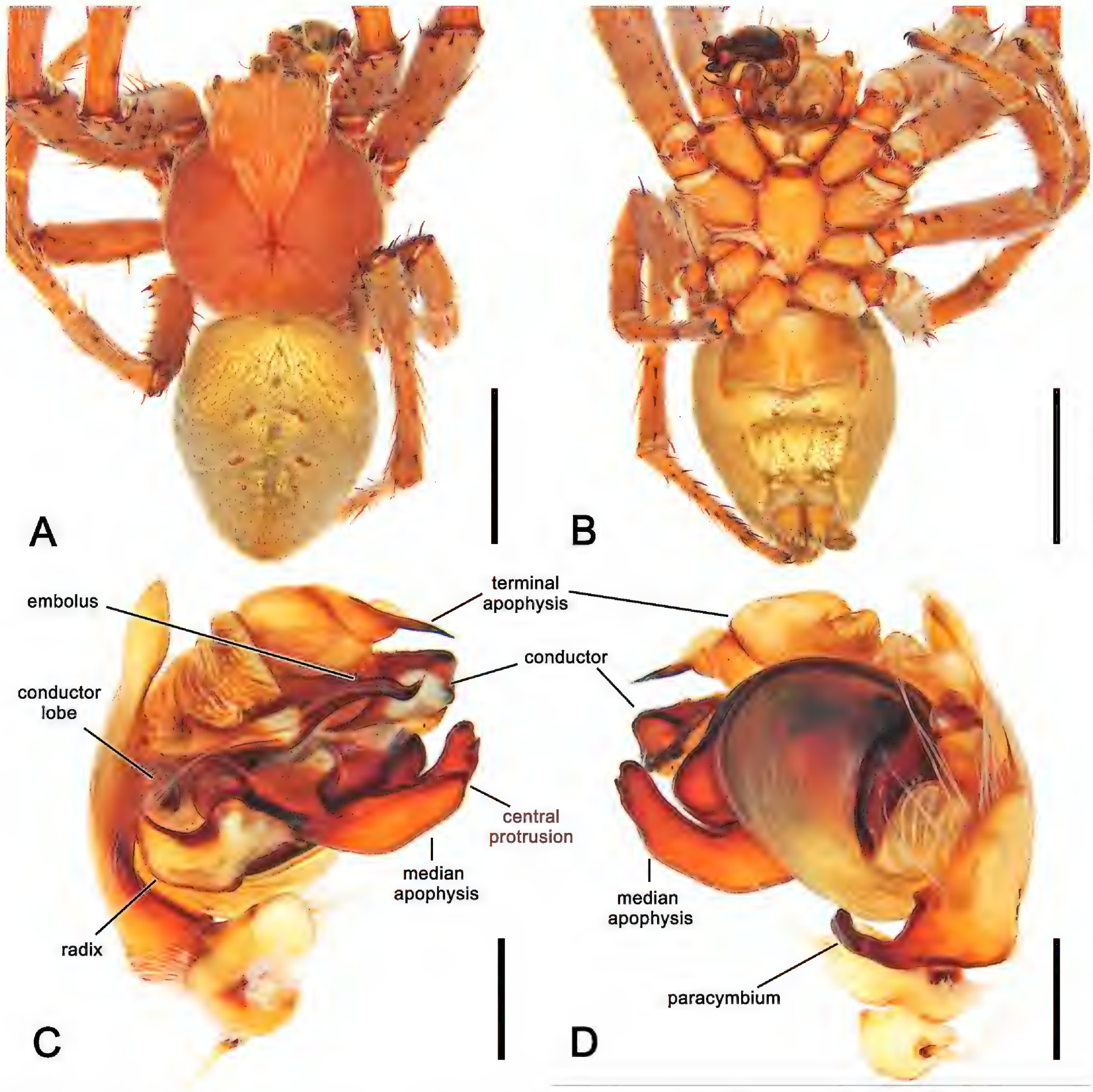

Figure 24. *Hortophora transmarina* comb. nov., male (WAM T67957). **A.** dorsal habitus; **B.** ventral habitus; **C.** left pedipalp, ventral view; **D.** left pedipalp, dorsal view. Scale bars: 5 mm (**A, B**); 1 mm (**C, D**).

(Fig. 24C); conductor subquadrate, sclerotized apically with membranous central portion, slightly carved out at its tip (Fig. 24C, D); elongate and terminally sinuous (Fig. 24C).

Female (WAM T70164): Total length 18.5. Carapace 9.5 long, 8.4 wide; colouration as in male (Fig. 25A). Eye diameter: AME 0.34, ALE 0.23, PME 0.29, PLE 0.22; row of eyes: AME 1.17, PME 0.90, PLE 4.75. Chelicerae, legs, labium and endites as in male but slightly darker (Fig. 25A, B). Chelicerae with four promarginal teeth (apical and third largest), and three retromarginal teeth (similar size). Labium 0.99 long, 1.98 wide. Pedipalp length of segments (femur + patella + tibia + cymbium = total length): 2.8 + 1.4 + 1.9 + 3.2 = 9.3. Leg formula I > IV > II > III; length of segments (femur + patella + tibia + metatarsus + tarsus = total length): I – 9.4 + 7.2 + 5.0 + 7.5 + 2.5 = 31.6, II – 8.6 + 7.0 + 4.9 + 0.9 + 2.4 = 23.8, III – 6.0 + 2.9 + 3.8 + 3.2 + 1.8 = 17.7, IV – 8.5 + 4.5 + 6.0 + 6.3 + 2.0 = 27.3. Sternum 4.3 long, 3.3 wide, orange-brown with sparse yellow setae (Fig. 25B). Abdomen 12.0 long, 9.5 wide; with distinct humeral humps; dorsum colour similar to male, but with three pairs of white guanine spots posterior to humerals; venter centrally dark brown, with white transverse bands posterior of epigastric furrow and anterior of spinnerets (Fig. 25A, B). Epigyne (Fig. 25C–E) base ovoid, slightly wider than long; atrium oval, wider than long; scape very elongated; centrally slightly narrower and more sclerotized; in posterior view the central division is very narrow with borders almost touching; baso-lateral flaps

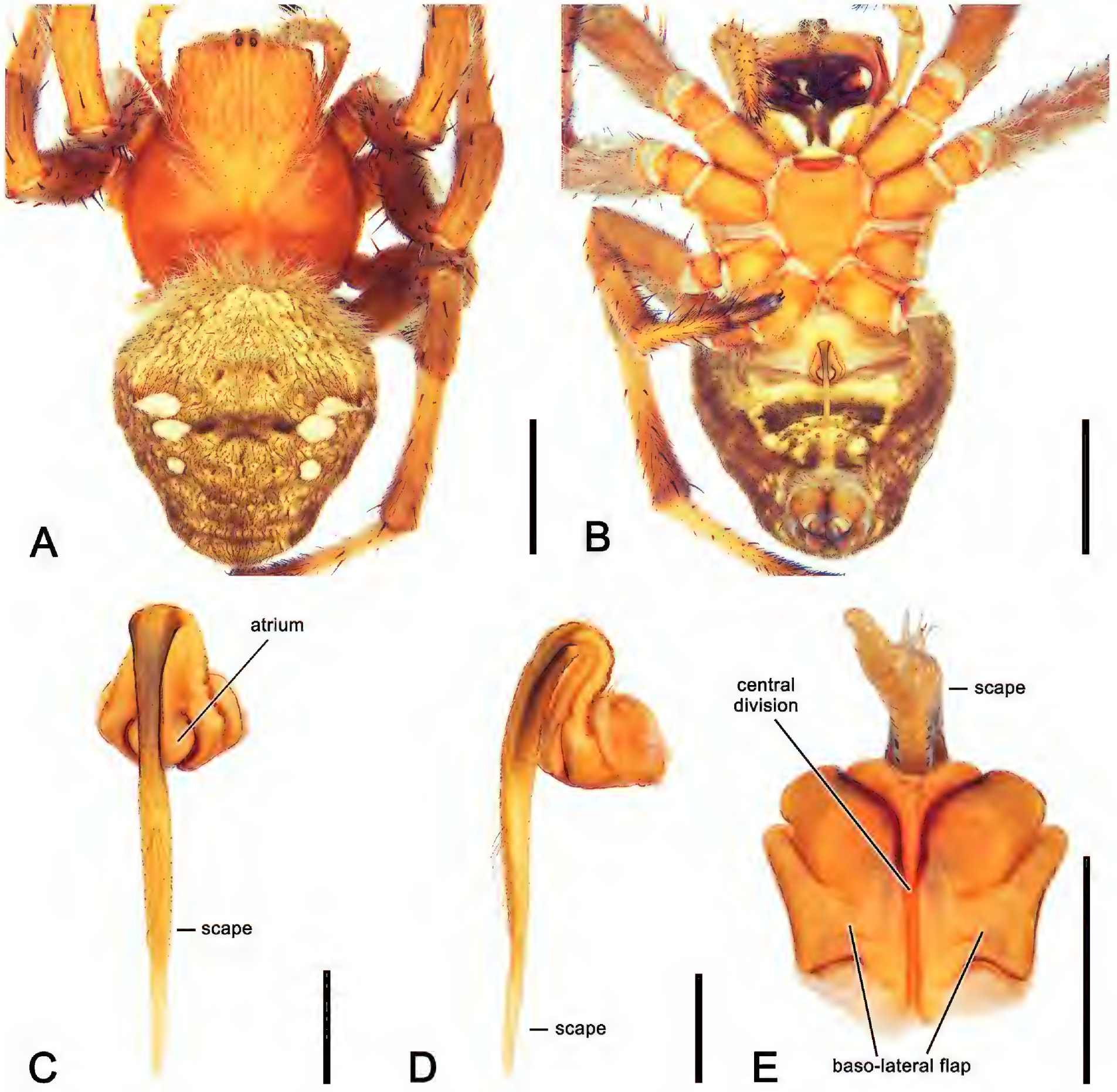

Figure 25. *Hortophora transmarina* comb. nov., female (WAM T84364). **A.** dorsal habitus; **B.** ventral habitus; **C.** epigyne, ventral view; **D.** epigyne, lateral view; **E.** epigyne, posterior view. Scale bars: 5 mm (**A, B**); 1 mm (**C–E**).

large and projected ventrally, also visible in ventral view (Fig. 25C).

Variation. Size variation: total length males 12.2–16.3 (n=10), females 18.1–25.8 (n=7). There was no incidence of a broken scape in the material of *H. transmarina* comb. nov. examined by us. Abdominal colour patterns varied in similar fashion as in *H. biapicata* comb. nov. and *H. tatianeae* sp. nov. with almost uniformly very dark brown specimens to those with distinct folium pattern and a variety of white guanine patterns.

Remarks. There is ample confusion about the type material of *Epeira transmarina* Keyserling, 1865 and *Epeira producta* L. Koch, 1867 which we have tried to resolve here based on an exhaustive examination of material in all institutions where Australian types of these authors are mainly known from, i.e. Hamburg (ZMH), Berlin (ZMB) and London (NHM) in combination with the material listed in the original descriptions.

Epeira transmarina was described based on multiple (in German "*mehrere*") (i.e., unknown number of) syntypes collected in New South Wales (Keyserling 1865, p. 815: "*Patria: Neu-Süd-Wales. Mehrere Exemplare in dem Museum Godeffroy in Hamburg, die vom Hrn. Dr. Graeffe gesammelt wurden*"). Only females were mentioned in the description, so any specimen lots containing males are unlikely part of the type series.

The NHM has two specimen lots collected in New South Wales potentially being part of the type series, i.e., 1 male and 2 females collected in Sydney with handwritten labels by L. Koch (NHM 1915.3.5.992–994). These

are unlikely types of *E. transmarina*, as identified based on an accompanying label as *E. producta*, collected in Sydney (and not labelled New South Wales) and as it contains a male. A second lot, also with 1 male and 2 females collected in Sydney and possibly part of the Keyserling collection (NHM 4235–6) is, for the same reasons as above, not considered part of the type series. A third lot of 1 female and 3 immatures in the ZMB (ZMB 22413) cannot be part of the type series. Whilst the locality is "New South Wales", the specimens were collected by Overbeck, not Graeffe based on a label with the spiders. A fourth lot is a vial with 5 females in the ZMH without locality data and a label: "e Mus. God.; det. Keys." and a second label handwritten by E. v. Keyserling "*Epeira transmarina* Keys. = *producta* L.K." is here considered part of the type series (ZMH), but no other vial in that collection. Curiously, that vial also included two females of *Backobourkia heroine* and one female of *H. biapicata* comb. nov., which we, however, do not consider part of the type series. A fifth lot in the NHM contains 4 mature females and 1 juvenile and was part of the Godeffroy collection (labelled with Schmeltz (1866, 1869)-catalogue species no. "2286" for *E. producta*). The specimens did not have any locality data with it. Although Schmeltz (1866, 1869) did not explicitly name "New South Wales" as the collecting locality, but "New Holland" (Schmeltz 1866) and Brisbane, Rockhampton an Port Mckay, all in Queensland (Schmeltz 1869), these spiders cannot be excluded from consideration to be part of the type series based on the criteria above and are here considered syntypes. We here refrain from designating a lectotype from these spiders as Davies (1980) as the first reviser clearly identified the males of this species. Rack (1961)-catalogue no. 282 listed a female syntype from New South Wales and two male paratypes ("*Paratypoids*") from Rockhampton (Queensland) in the ZMH. We could not locate a single female from New South Wales in the ZMH (VWF pers. obs.) and the males from Rockhampton cannot be part of the type series, which was described from New South Wales. Davies (1980) also reported these two males from Rockhampton as paratypes in her material examined, likely based on Rack's (1961) erroneous listing.

Ludwig Koch (1867) described *Epeira producta* based on an unknown number of mature females ("*Entwickelte Weibchen*") collected by Amelie Dieterich in Brisbane (L. Koch, 1867). Koch (1871) when redescribing the species lists specimens from Brisbane, Rockhampton, Sydney (two pinned specimens) and one specimen in ethanol from "Neuholland" (L. Koch, 1871, p. 58: "*Exemplare im Museum Godeffroy von Brisbane und Rockhampton, – zwei aufgesteckte Thiere dieser Species von Sydney und eines in Weingeist mit der Bezeichnung „Neuholland" ohne nähere Angabe im kgl. Museum zu Stuttgart.*"). However, only the Brisbane specimens referred to in L. Koch's (1871) later treatment are part of the type series. Only two specimen lots examined by us were collected in Brisbane and fulfil the criteria of the original description as in the type listing above. Although both include juvenile specimens this does not surprise as sometimes penultimate females were considered mature by the early authors.

Dondale (1966, p. 1164) synonymised *Epeira thyridota* Thorell, 1870 with *H. transmarina* comb. nov. based on the "*study of original description and of Koch's (1871, p. 52) redescription of Thorell's types*." This synonymy is rejected here. We were not able to examine the syntype specimens of this species (1 male, 1 juvenile female, "Celeberrimo R., Nova Hollandia", Coli. Dom Pessler" (possibly in NRM)). However, L. (Koch 1871) redescribed these type specimens, including a detailed illustration of the male pedipalp (L. Koch, 1871, plate 7, fig. 1a). This clearly shows the basal flange of the median apophysis characteristic for *Backobourkia*. We therefore transfer *Epeira thyridota* to *Backobourkia*, *B. thyridota* (Thorell, 1870), comb. nov. It is likely, that this species is a senior synonym of either *B. brounii* (Urquhart, 1885) or *B. heroine* (L. Koch, 1871) but a detailed examination of the male pedipalp conductor of the *E. thyridota* male syntype is required for a taxonomic decision on this synonymy (see Framenau et al. 2010). Unfortunately, the NRM was not accessible when our current study was completed (T. Kronestedt, pers. comm. to VWF).

Life history and habitat preferences. Mature males of *H. transmarina* comb. nov. have largely been found between December and March, with few records in other months, but none in September and October. Mature females were found largely between December and May, with very few records between June to November. Therefore, the species is largely summer mature (or in the northern latitudes wet season). Within its range, *H. transmarina* comb. nov. is found in open woodlands, from dry sclerophyll to rainforest, wherever it can fix its large orb-webs between shrubs and trees. It is also common in suburban parks and gardens.

Distribution. *Hortophora transmarina* comb. nov. has been found along the east coast of Australia from southern New South Wales to the Top End, but also into the northern parts of the Northern Territory and Western Australia (Fig. 26). The species has also been found in Papua New Guinea (Chrysanthus 1960).

Hortophora urbana (Keyserling, 1887), comb. nov.

Figs 2I, 3D, 27–29

Epeira urbana Keyserling 1887: 160–161, plate 13, figs 5, 5a.

Araneus urbanus (Keyserling).- Rainbow 1911: 195.

Type material. ***Holotype*** of *Epeira urbana* Keyserling, 1887: Male, Sydney (33°52'S, 151°12'E, New South Wales, Australia), Bradley collection (considered lost; see Framenau (2005)).

Other material examined. See Appendix 1.

Diagnosis. Males of *H. urbana* comb. nov. can easily be distinguished from all other *Hortophora* gen. nov. species by distinct shape of the median apophysis of male pedipalp. Whilst it is elongate transverse with a central protrusion as in many other species, both the central protrusion and the apical tip are blunt with only very small

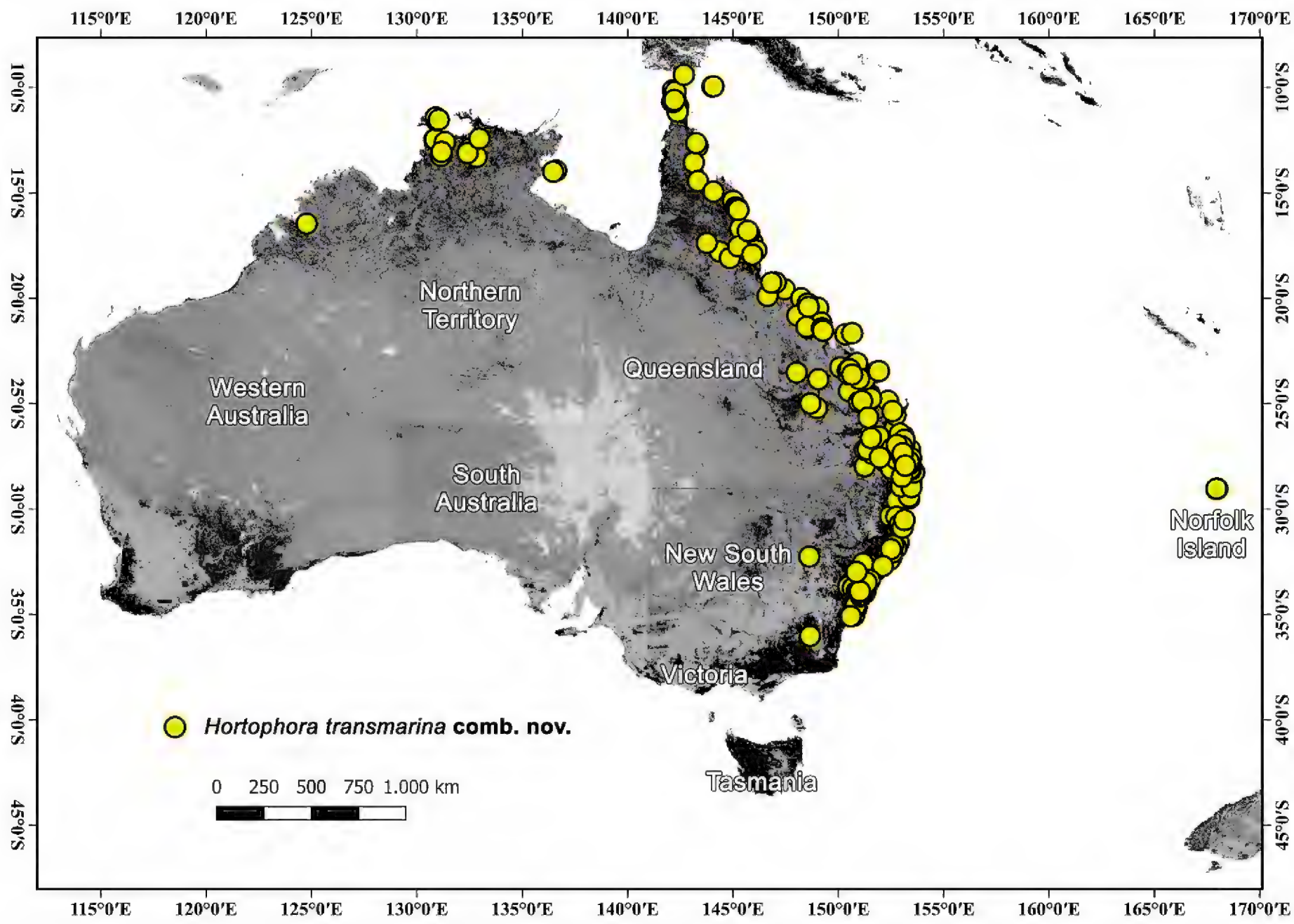

Figure 26. Distribution records of *Hortophora transmarina* comb. nov. in Australia.

teeth apically (Figs 3D, 27C), whereas these are generally pointed in other species of similar size, such as *H. biapicata* comb. nov. (Fig. 7A, H) and *H. transmarina* comb. nov. (Fig. 24C). The epigyne scape of *H. urbana* comb. nov. is unlike that of any other species, as it is comparatively strong, centrally widened and has distinct transverse wrinkles (Fig. 28C–E).

Description. Male (QM S111900): Total length 10.0. Carapace 5.1 long, 4.7 wide, reddish-brown, anterior cephalic area somewhat lighter (Fig. 27A). Eye diameter AME 0.31, ALE 0.18, PME 0.20, PLE 0.18; row of eyes: AME 0.83, PME 0.59, PLE 2.48. Chelicerae brown; three promarginal teeth (median largest) and three retromarginal teeth (basal largest). Legs orange-brown (Fig. 27A, B). Tibiae of leg II with cluster of thick setae prolaterally, but no apico-ventral megaspur (Fig. 2H). Leg formula I > IV > II > III; length of segments (femur + patella + tibia + metatarsus + tarsus = total length): I – 6.4 + 2.5 + 4.8 + 5.2 + 1.4 = 20.3, II – 5.8 + 2.2 + 4.5 + 0.9 + 1.4 = 14.8, III – 3.6 + 1.4 + 2.3 + 2.3 + 1.0 = 10.6, IV – 4.6 + 2.0 + 3.5 + 3.8 + 1.1 = 15.0. Labium 0.63 long, 0.85 wide, reddish-brown; endites dark brown (Fig. 27B). Sternum 2.3 long, 1.9 wide, irregular light brown-brown, covered with white setae (Fig. 27B). Abdomen 5.0 long, 4.5 wide, dorsum with indistinct humeral humps, beige with darker folium pattern and central brown line (Fig. 27A); venter olive-grey with indistinct lateral white lines (Fig. 30B). Pedipalp length of segments (femur + patella + tibia + cymbium = total length): 1.2 + 0.5 + 0.4 + 2.1 = 4.2; paracymbium elongated and curved, ending on a hook-like rounded tip (Figs 3D, 27C, D); median apophysis elongated transverse with blunt rounded central protrusion and indistinct tips (Figs 3D, 27C); conductor lobe of standard shape and size (Figs 3D, 27C); terminal apophysis deflated, ending in an elongated, sclerotised tip (Figs 3D, 27C); conductor heavily sclerotized ending in two rounded projections (Figs 3D, 27C, D); embolus elongated and sinuous (Figs 3D, 27C).

Female (QM S111901): Total length 17.00. Carapace 4.5 long, 6.1 wide; very dark brown, cephalic area lighter and covered with white setae (Fig. 28A). Eye diameter AME 0.90, PME 0.67, PLE 3.52. Chelicerae reddish-brown; four promarginal teeth (apical and third largest) and three retrolateral (similar size). Leg colouration as in male (Fig. 28A, B). Pedipalp length of segments (femur + patella + tibia + tarsus = total length): 2.2 + 1.0 + 1.3 + 2.7 = 7.2. Leg formula I > IV > II > III; length of segments (femur + patella + tibia + metatarsus + tarsus = total length): I – 7.5 + 3.8 + 6.3 + 6.6 + 2.0 = 26.2, II – 6.5 + 3.5 + 5.8 + 0.9 + 1.9 = 1.6, III – 5.0 + 1.7 + 3.0 + 3.0 + 1.3 = 14.00, IV – 6.7 + 3.1 + 4.5 + 5.0 + 1.6 = 20.9. Labium 0.90 long, 1.53 wide, as in male; endites as in male (Fig. 28B). Sternum 3.2 long, 2.7 wide, reddish-brown, centrally somewhat darker (Fig. 28B). Abdomen 13.0 long, 11.0 wide, similar as male but colouration poorly preserved (Fig. 28A, B). Epigyne (QM S111902) (Fig. 28C–E) wider

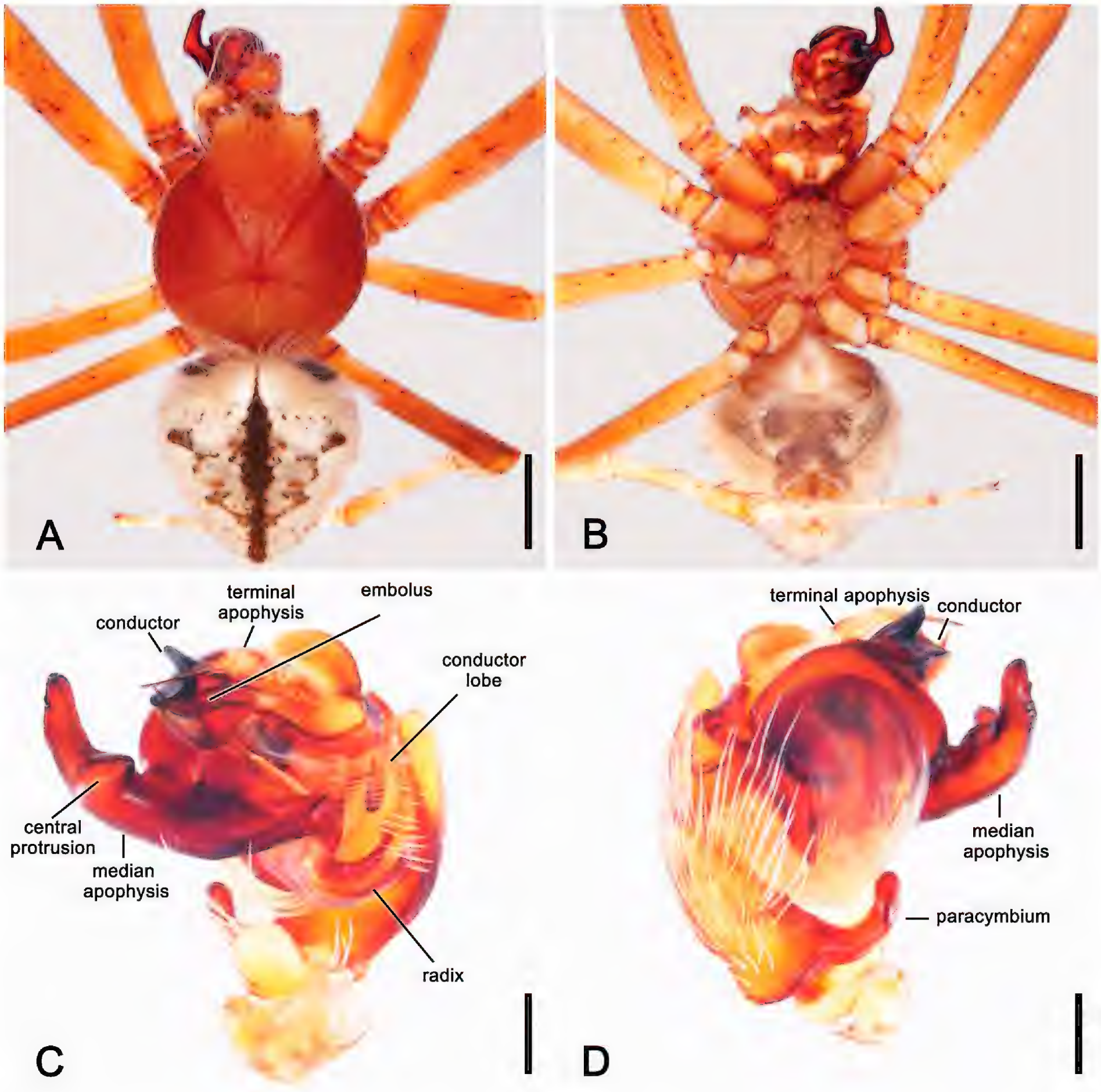

Figure 27. *Hortophora urbana* comb. nov., male (QM S111900). **A.** dorsal habitus; **B.** ventral habitus; **C.** right pedipalp, ventral view; **D.** right pedipalp, dorsal view. Scale bars: 2 mm (**A, B**); 0.5 mm (**C, D**).

than long; scape thick and wrinkled, constricted anteriorly with very sclerotized and black lateral edges.

Variation. Size variation: total length males 10.0–13.1 (n=4), females 13.1–20.0 (n=8). The epigyne scape was broken off in half the females measured here. Abdominal colour patterns are fairly variable in *H. urbana* comb. nov. male and females, from dark specimens to very light ones as illustrated here. The folium pattern is generally not very distinct, but light guanine spot and lines are frequent.

Remarks. The holotype of *Epeira urbana* Keyserling, 1887 was part of the Bradley collection and is considered lost (Framenau. 2005, 2019), but we do not consider it necessary to designate a neotype, as the original illustrations of the male pedipalp in combination with the distribution of the species allow an accurate identification.

We described the best preserved female available to us, but as the scape of this specimens was broken off (Fig. 28B), we described an intact scape of a different female.

Life history and habitat preferences. Mature males of *H. urbana* comb. nov. were collected in November and December and mature females from December to April indicating summer-maturity (equivalent to the wet season in northern latitudes). Habitat descriptions with museum specimens include rainforest and soft-wood scrub, but a single record is from a suburban clothes line.

Distribution. *Hortophora urbana* comb. nov. has mainly been found along the east coast of Australia from southern New South Wales to northern Queensland, but occurs into northern Western Australia (Fig. 29).

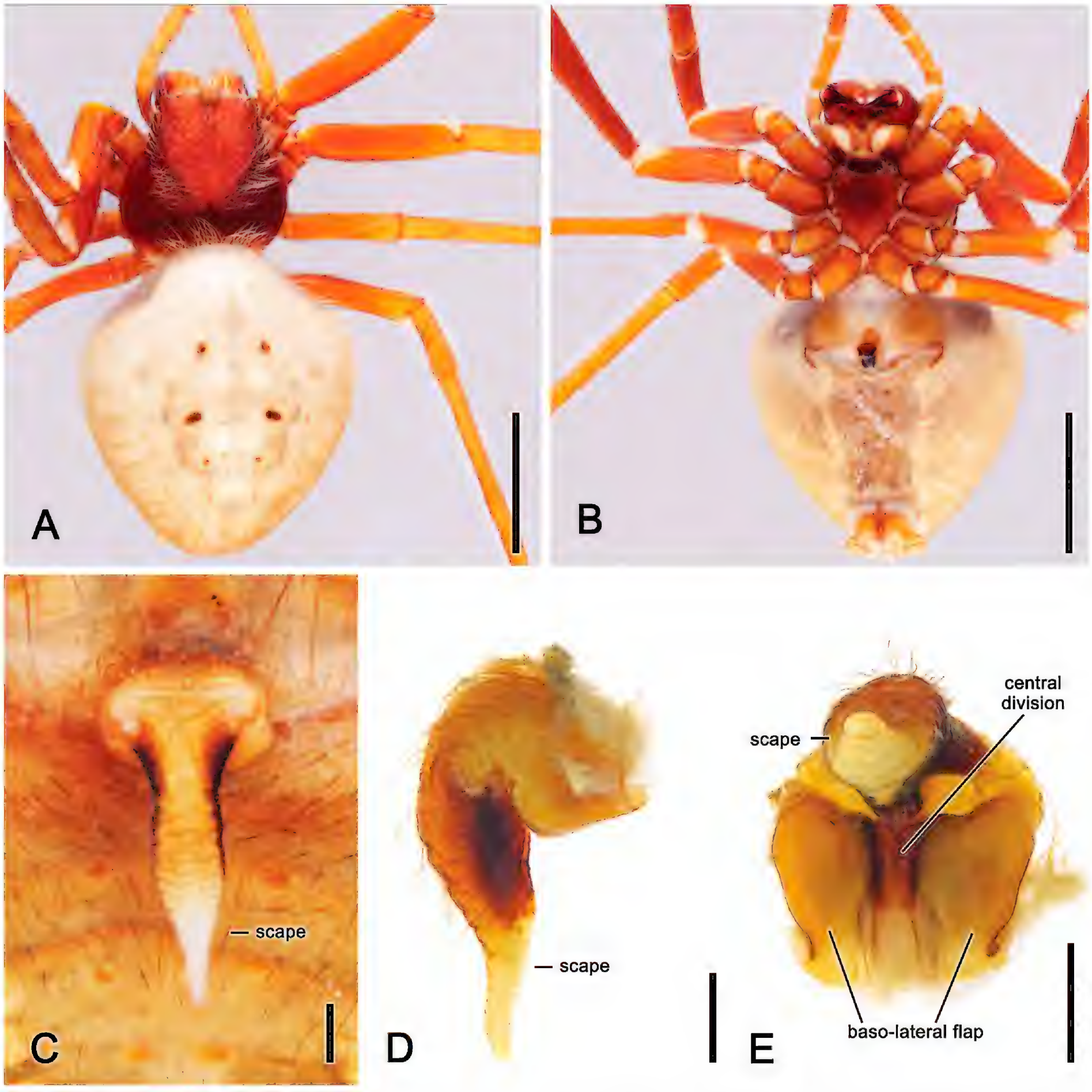

Figure 28. *Hortophora urbana* comb. nov., female. **A.** dorsal habitus (QM S111901); **B.** ventral habitus (QM S111901); **C.** epigyne, ventral view (QM S111901); **D.** epigyne, lateral view (QM S111902); **E.** epigyne, posterior view (QM S111902). Scale bars: 5 mm (**A, B**); 0.5mm (**C–E**).

Hortophora walesiana (Karsch, 1878), comb. nov.

Figs 2J, 5, 30–32

Epeira walesiana Karsch 1878: 805–806.

Epeira rhombocephala Thorell 1881: 98–101. **New synonymy**.

Cyclosa rhombocephala (Thorell).- Simon 1895: 780.

Epeira lutulenta Keyserling 1886: 143–144, plate 11, figs 6, 6a. **New synonymy**.

Type material. ***Holotype*** of *Epeira walesiana* Karsch, 1878: Male, New South Wales (no exact locality), Daemel (ZMB 1429). Examined.

Holotype of *Epeira rhombocephala* Thorell, 1881: Male, Somerset, Cape York (10°43'S, 142°31'E, Queensland, Australia) 1875, L. D'Albertis (MSNG). Photographs examined.

Holotype of *Epeira lutulenta* Keyserling, 1886: Female, Peak Downs (22°56'S, 148°05'E, Queensland, Australia) (ZMH, Rack (1961)-catalogue no. 249). Examined.

Other material examined. See Appendix 1.

Diagnosis. Males of *H. walesiana* comb. nov. are most similar to those of *H. lodicula* comb. nov. due to the comparatively short median apophysis of the pedipalp that terminates in an apically pointing lobe. (Fig. 12C vs 30C). However, the terminal apophysis of *H. walesiana* comb. nov. is large and bubble-shaped, but inconspicuous in *H. lodicula* comb. nov. The strong, curved lateral borders of the epigyne of female of *H. walesiana* comb. nov. (Fig. 31C) are somewhat similar to those of *H. porongurup* comb. nov.

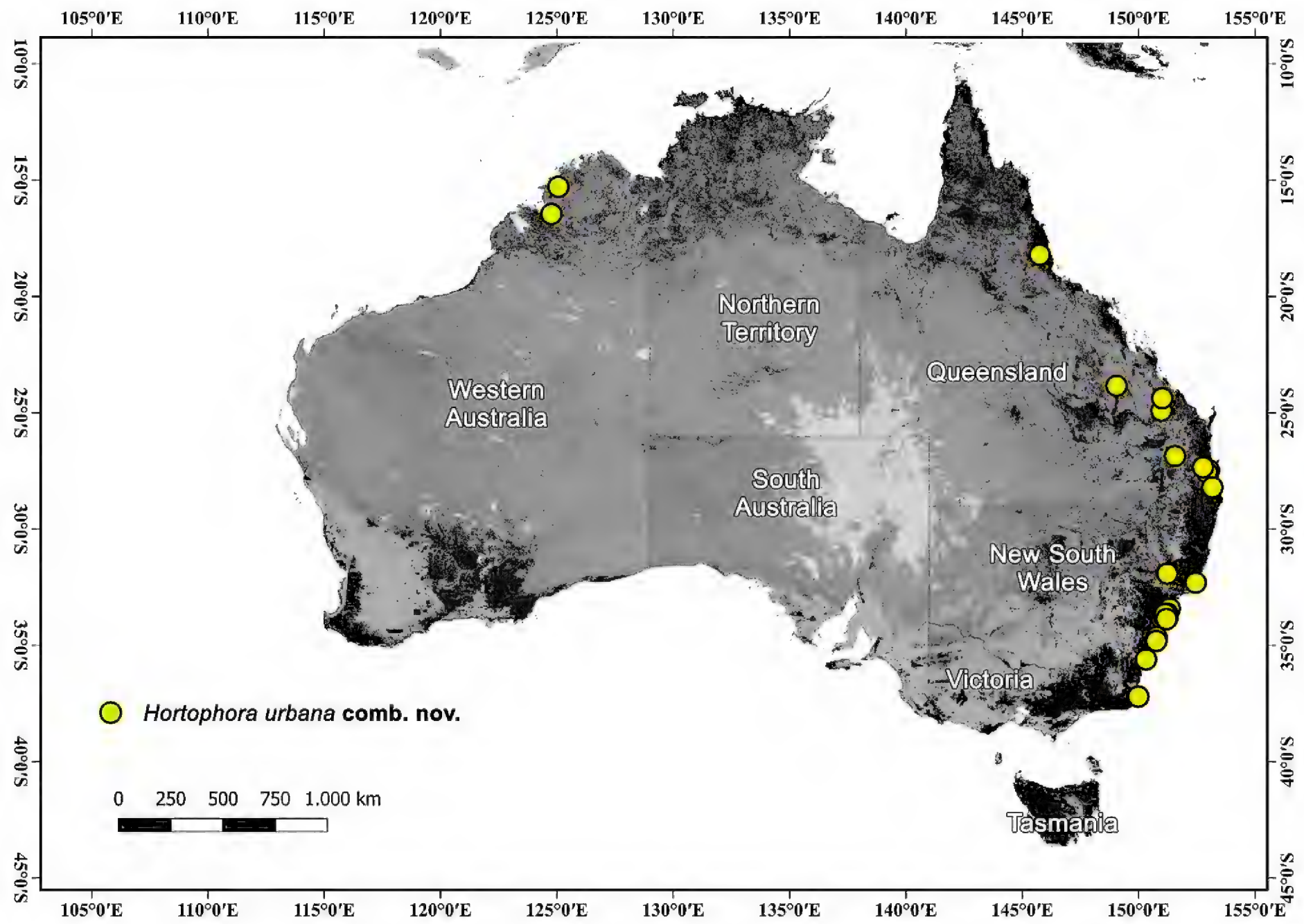

Figure 29. Distribution records of *Hortophora urbana* comb. nov. in Australia.

(Fig. 19C), but overall much slimmer and therefore the atrium much larger.

Description. Male (WAM T75383): Total length 5.9. Carapace 3.3 long, 2.9 wide, dark-brown, cephalic area slightly lighter and with white setae (Fig. 30A). Eye diameter AME 0.23, ALE 0.18, PME 0.16, PLE 0.16; row of eyes: AME 0.72, PME 0.54, PLE 1.62. Chelicerae dark-brown; four promarginal teeth (apical group of three, median largest) and one retromarginal tooth (Fig. 30B). Legs brown with beige annulations, femora basally beige (Fig. 30A, B). Tibiae of leg II with thickened setae but without a megaspur (Figs 2I, 30A). Leg formula I > IV > II > III; length of segments (femur + patella + tibia + metatarsus + tarsus = total length): I – 3.3 + 1.7 + 2.5 + 2.3 + 0.9 = 10.7, II – 2.9 + 1.3 + 2.1 + 0.9 + 0.9 = 8.1, III – 2.0 + 1.0 + 1.3 + 1.0 + 0.7 = 6.0, IV – 2.9 + 1.1 + 2.3 + 2.0 + 0.9 = 9.2. Labium 0.41 long, 0.59 wide, brown; endites brown (Fig. 30B). Sternum 1.6 long, 1.1 wide, brown, irregularly lighter centrally (Fig. 30B). Abdomen 2.9 long, 2.7 wide, dorsum with distinct humeral humps, dark olive-grey with dark folium pattern and light lines and spots (Fig. 30A); venter dark olive-brown, some lighter discolourations (Fig. 30B). Pedipalp length of segments (femur + patella + tibia + cymbium = total length): 0.5 + 0.4 + 0.3 + 1.00 = 2.2; paracymbium short, ending in a hook-like rounded tip (Fig. 30D); median apophysis transverse, terminating in an apically bent lobe (Fig. 30C, D); conductor lobe of standard size (Fig. 30C); terminal apophysis, bubble-shaped and directed basally, terminating in a slightly cured spine (Fig. 30C); conductor heavily sclerotized; embolus heavily sclerotised, thick and short (Fig. 30C).

Female (WAM T88936): Total length 8.40. Carapace 3.10 long, 2.90 wide; light brown, flanks dark brown, covered with white setae (Fig. 31A). Eye diameter AME 0.23, ALE 0.13, PME 0.18, PLE 0.13; row of eyes: AME 0.67, PME 0.47, PLE 1.92. Chelicerae yellow-brown; four promarginal teeth (apical and third largest) and three retromarginal teeth (basal largest). Legs yellow-brown, mottled with brown spots (Fig. 31A, B). Pedipalp length of segments (femur + patella + tibia + tarsus = total length): 1.0 + 0.5 + 0.6 + – + 1.1 = 3.2. Leg formula I > IV = II > III; and length of segments: I – 3.0 + 1.6 + 2.3 + 2.0 + 1.0 = 9.9, II – 2.5 + 0.9 + 2.1 + 1.9 + 1.0 = 8.4, III – 2.0 + 0.8 + 1.3 + 1.2 + 0.8 = 6.1, IV – 2.7 + 0.9 + 2.1 + 1.8 + 0.9 = 8.4. Labium 0.58 large, 0.77 wide, orange-brown; endites orange-brown (Fig. 31B). Sternum 1.6 long, 1.3 wide, yellow-brown, lighter centrally (Fig. 31B). Abdomen 6.0 long, 6.0 wide, dorsum with distinct humeral humps, beige with indistinct folium pattern and mottled with small brown spots (Fig. 31A); venter light olive-brown and covered by guanine crystals (Fig. 31B).

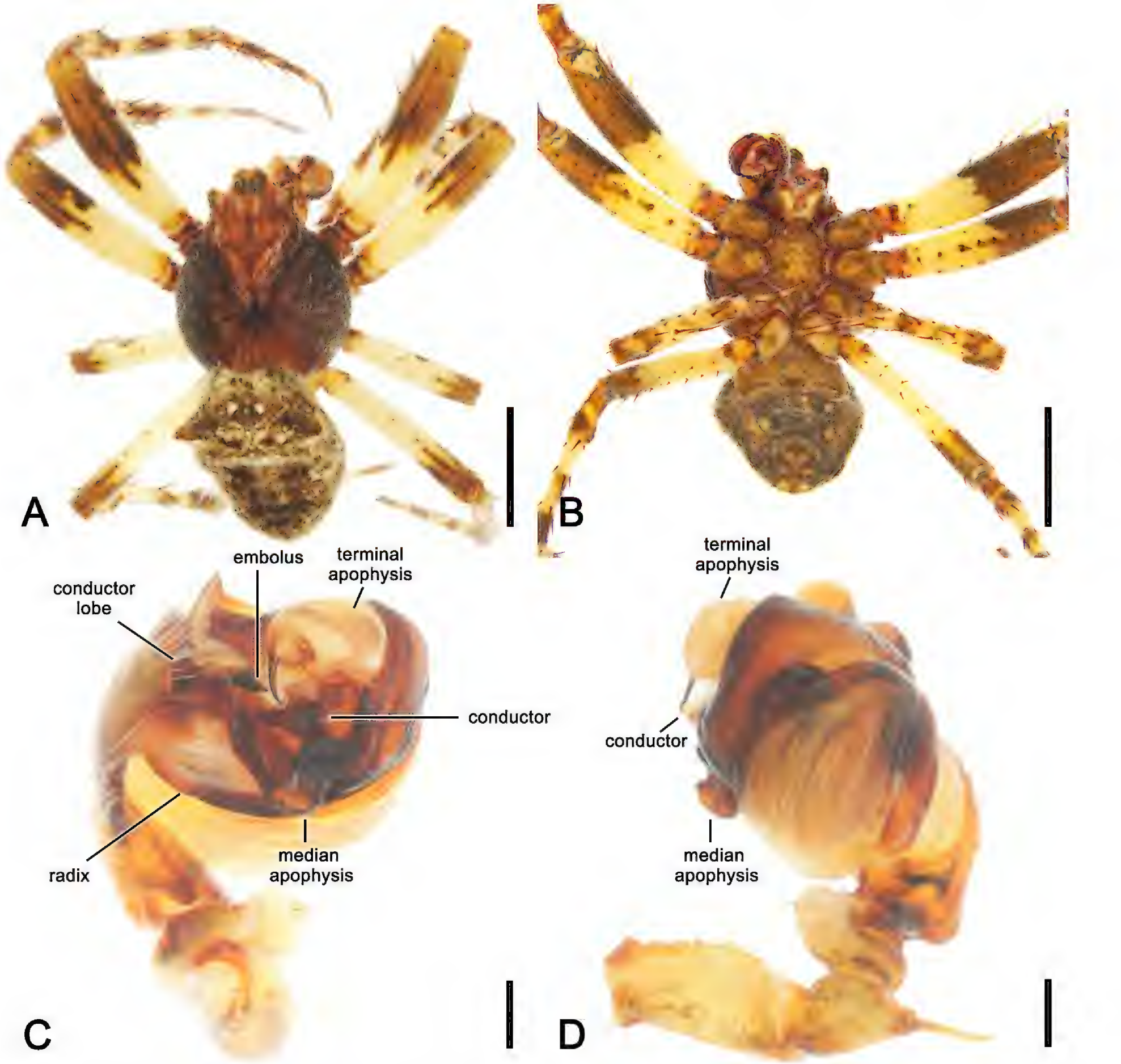

Figure 30. *Hortophora walesiana* comb. nov., male (QM S111900). **A.** dorsal habitus; **B.** ventral habitus; **C.** right pedipalp, ventral view; **D.** right pedipalp, dorsalview. Scale bars: 2 mm (**A, B**); 0.2 mm (**C, D**).

Epigyne (HBI N25742-6) (Fig. 31C–E) with large atrium and thick borders; scape shorter than epigyne long with few setae.

Variation. Size variation: total length males 5.2–6.4 (n=15), females 8.2–10.1 (n=6). We did not observe any scape break-off in *H. walesiana* comb. nov. Colour variations are as reported for other *Hortophora* gen. nov. species, from fairly dark (as in the male described here) to the light colouration of the female illustrated, but the folium pattern is generally fairly indistinct.

Remarks. Somatic and genitalic characters, specifically male pedipalp morphology of the holotype of *Epeira rhombocephala* Thorell, 1881 match *H. walesiana* comb. nov. as diagnosed here. *Epeira rhombocephala* is therefore proposed as junior synonym of *H. walesiana* comb. nov. Similarly the female holotype of *Epeira lutulenta* Keyserling, 1886 matches in somatic and genitalic morphology those belonging to *H. walesiana* comb. nov. and therefore *Epeira lutulenta* is proposed as junior synonym of *H. walesiana* comb. nov.

Life history and habitat preferences. Mature males have been found in January and February, with a single record from June. Mature females have been found from January to April, with a single record in August. *Hortophora walesiana* comb. nov. therefore appears to be most active in the late dry season, considering that the species is limited to the northern half of the country.

Distribution. *Hortophora walesiana* comb. nov. has been found mainly towards the coastal areas in the northern half of Australia, north of ca. 27°S Latitude in the Northern Territory, Queensland and Western Australia (Fig. 32). The holotype was collected at an unspecified location in New South Wales (Karsch 1878) and it can be assumed that the type locality, if not erroneously reported, was in the north-eastern part of that state.

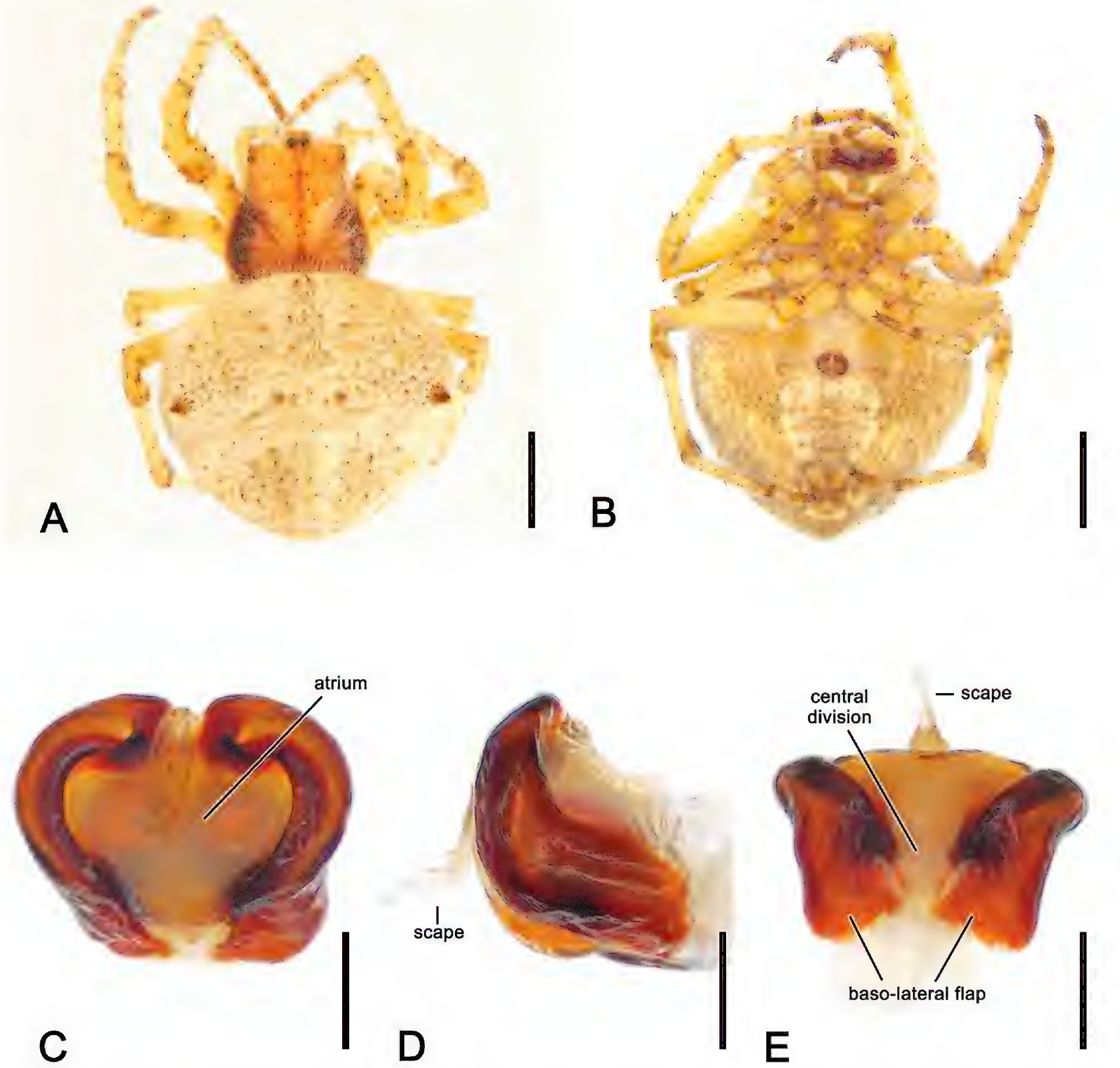

Figure 31. *Hortophora walesiana* comb. nov., female. **A.** dorsal habitus (WAM T88936); **B.** ventral habitus (WAM T88936); **C.** epigyne, ventral view (HBI N25742-6); **D.** epigyne, lateral view (HBI N25742-6); **E.** epigyne, posterior view (HBI N25742-6). Scale bars: 5 mm (**A, B**); 0.5 mm (**C–E**).

Hortophora yesabah Framenau & Castanheira sp. nov.

http://zoobank.org/2405EBD0-6BF0-4C97-BCFE-3ED9519F494D

Figs 2K, 33–35

Type-material. ***Holotype*** male, Dandabah, Bunya Mountains National Park (26°51'S 151°34'E, Queensland, Australia), QM Party, 1–7 March 1976 (QM S111896).

Etymology. The specific epithet refers to the Yesabah Caves (New South Wales), one of the few localities where the species was found. It is a noun in apposition.

Other material examined. See Appendix 1.

Diagnosis. The male pedipalp of male *H. yesabah* sp. nov., specifically the shape of the median apophysis is unlike any other in the genus, as it terminates in two large somewhat pointy lobes, of which the dorsal one is heavily sclerotised (Fig. 33D). Females of *H. yesabah* sp. nov. are similar to the ones of *H. lodicula* comb. nov., however, the epigyne of *H. yesabah* sp. nov. is broad at the base of the scape (Fig. 34C), whereas it is narrow at the base of the scape in *H. lodicula* comb. nov. (Fig. 13C).

Description. Male (holotype, QM S11896): Total length 7.6. Carapace 3.8 long, 3.1 wide, dark-brown, cephalic area somewhat lighter and covered in white setae (Fig. 33A). Eye diameter AME 0.27, ALE 0.18, PME 0.20, PLE 0.18; row of eyes: AME 0.74, PME 0.49, PLE 1.62. Chelicerae reddish-brown; four promarginal teeth (apical and third largest) and three retromarginal teeth (similar size). Legs brown with light discolourations, specifically ventrally and on legs III and IV (Fig. 33A,

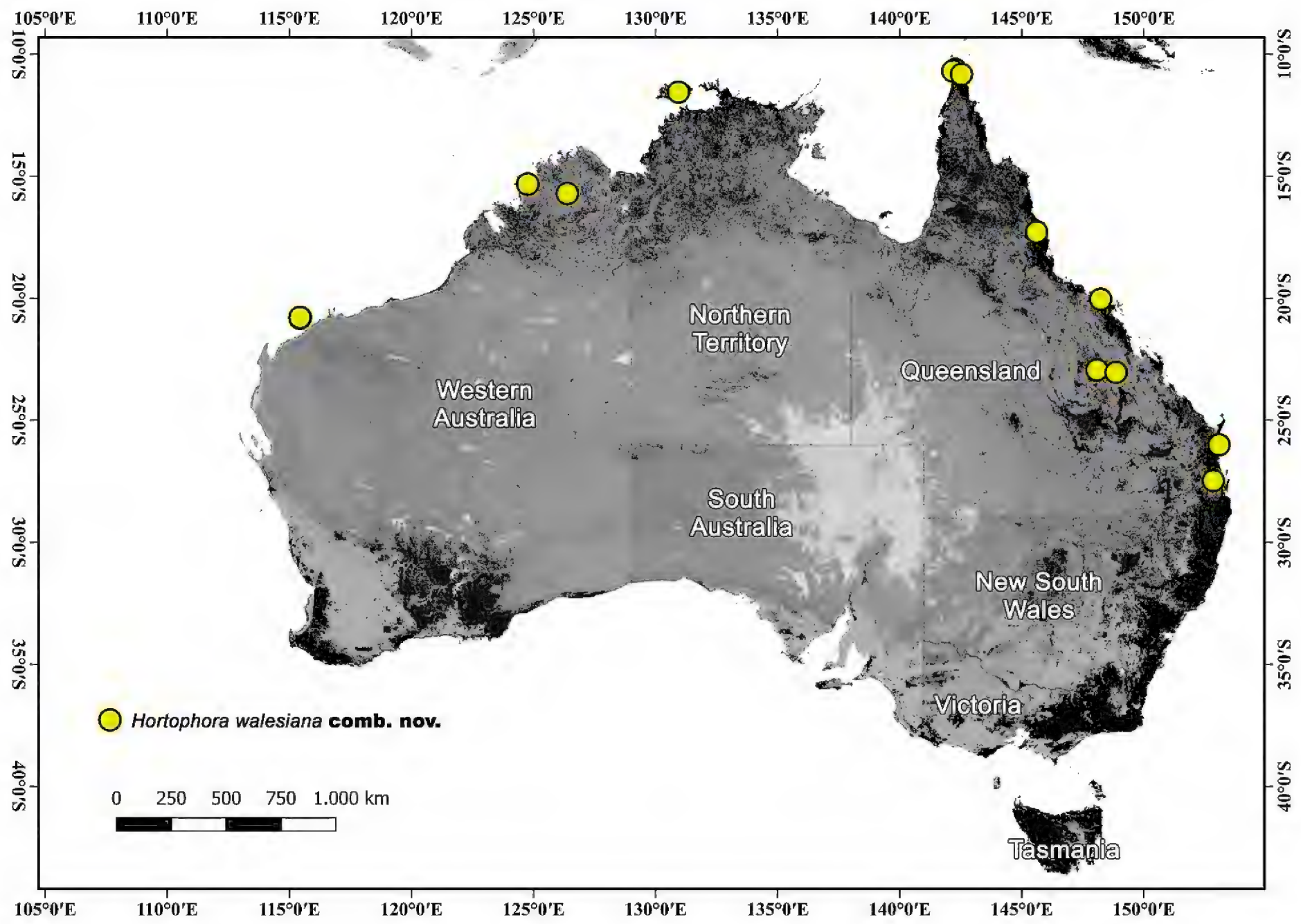

Figure 32. Distribution records of *Hortophora walesiana* comb. nov. in Australia.

B). Tibiae of leg II with few strong setae and a conspicuous megaspur with strong spine (Fig. 2J). Leg formula I > IV > II > III; length of segments (femur + patella + tibia + metatarsus + tarsus = total length): I – 4.3 + 1.7 + 4.0 + 3.5 + 1.1 = 14.6, II – 3.8 + 1.5 + 3.5 + 0.9 + 1.0 = 10.7, III – 2.7 + 0.9 + 1.7 + 1.8 + 0.8 = 7.9, IV – 3.7 + 1.3 + 2.8 + 2.6 + 0.9 = 11.3. Labium 0.45 long, 0.72 wide, dark brown; endites brown (Fig. 33B). Sternum 1.6 long, 1.4 wide, dark brown, yellow-brown centrally (Fig. 33B). Abdomen 4.0 long, 3.6 dorsum with humeral humps, olive-grey folium pattern on beige background (Fig. 33A); venter covered by large guanine patch (Fig. 33B). Pedipalp length of segments (femur + patella + tibia + cymbium = total length): 0.8 + 0.4 + 0.3 + 1.1 = 2.6; paracymbium short and ending in a hook-like rounded tip (Fig. 33D); median apophysis transverse, terminating in two broad lobes, the dorsal of which is heavily sclerotised (Fig. 36C); conductor lobe elongated apically (Fig. 33C); terminal apophysis bubble-shaped terminating in a short sclerotised tip; conductor heavily sclerotized and rounded (Fig. 33C); embolus thick and short (Fig. 33C).

Female (QM S111897): Total length 8.6. Carapace 4.2 long, 3.7 wide; reddish brown, centrally darker, cephalic area with few white setae (Fig. 34A). Eye diameter AME 0.79, PME 0.50, PLE 1.95. Chelicerae yellow-brown; four promarginal teeth (apical and third largest) and three retromarginal teeth (similar size). Leg colouration similar to male but with lighter hue (Fig. 34A, B). Pedipalp length of segments (femur + patella + tibia + tarsus = total length): 1.3 + 0.6 + 0.9 + 1.4 = 4.2. Leg formula I > IV > II > III; length of segments (femur + patella + tibia + metatarsus + tarsus = total length): I – 4.4 + 1.8 + 4.0 + 3.5 + 1.2 = 14.9, II – 4.2 + 1.8 + 3.6 + 0.9 + 1.2 = 11.7, III – 3.1 + 1.3 + 1.9 + 2.0 + 0.9 = 9.2, IV – 4.1 + 1.8 + 3.2 + 3.2 + 1.0 = 13.3. Labium 0.68 large, 0.99 wide, reddish-brown; endites brown (Fig. 34B). Sternum 2.1 long, 1.8 wide, brown, centrally yellow-brown (Fig. 34B). Abdomen 4.8 long, 4.8 with, dorsum with humeral humps, colouration and folium pattern as in male but with darker colour hue (Fig. 34A, B). Epigyne (QM S111898; Fig. 34C–E) dark reddish-brown, atrium longer than wide; central division narrow; scape elevated with large subquadrate base, slightly reaching posteriorly beyond epigyne, wrinkled and with long setae.

Variation. Size variation: total length males 7.5–8.9 (n=4), females 8.6.1–10.9 (n=5). The epigyne scape was broken off in one of five females measured for this study. A folium pattern is always clearly discernible in all specimens of *H. yesabah* sp. nov. examined by us, but no distinct white guanine patterns were evident.

Life history and habitat preferences. Mature males of *H. yesabah* comb. nov. were found from February to July and mature females from March to October. This suggests that this species is autumn and winter mature. The only habitat description with collection specimens reads ‘rainforest’.

Distribution. *Hortophora yesabah* comb. nov. has been found from south-eastern Queensland south to about Wollongong in eastern New South Wales (Fig. 35)

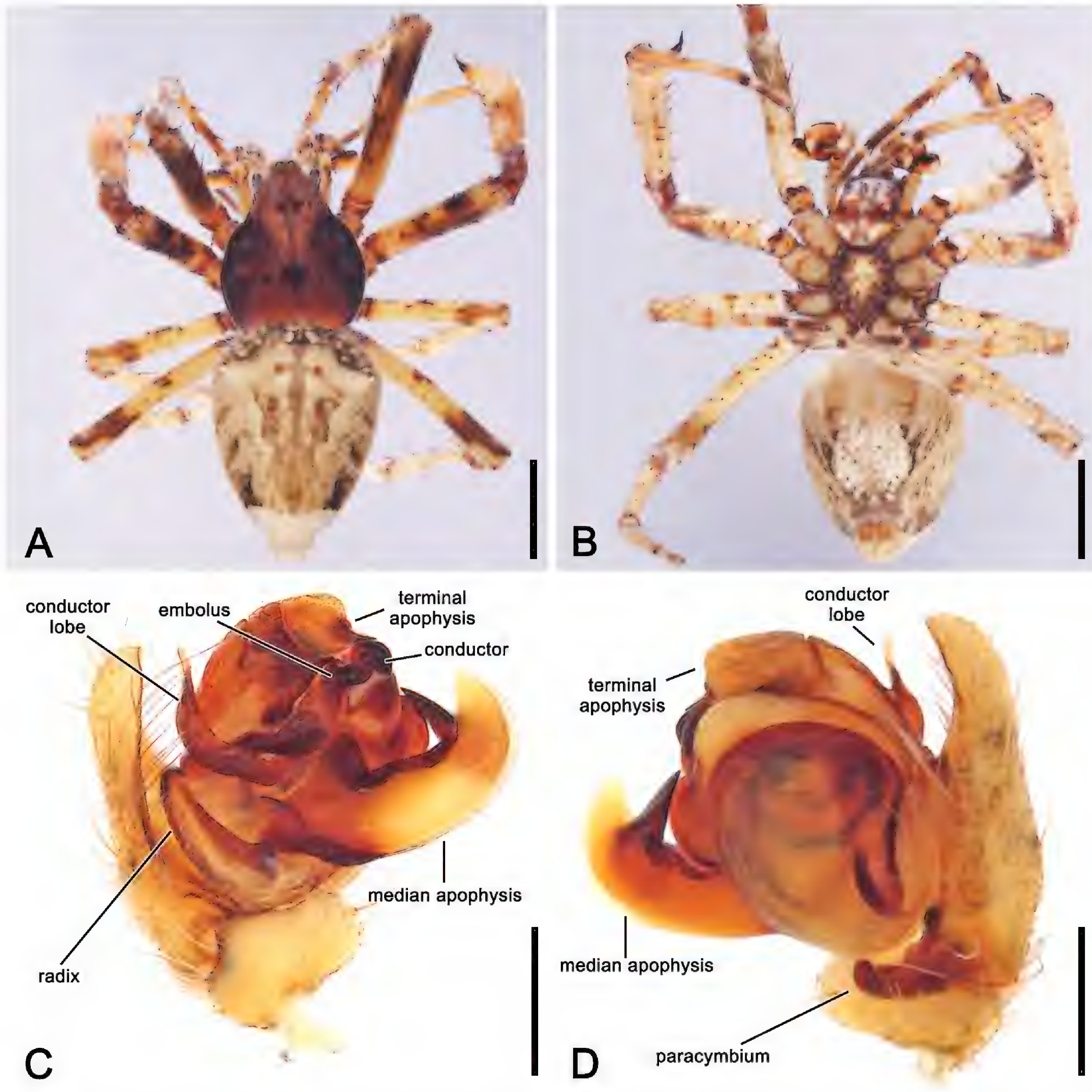

Figure 33. *Hortophora yesabah* sp. nov., male holotype (S111896). **A.** dorsal habitus; **B.** ventral habitus; **C.** right pedipalp, ventral view; **D.** right pedipalp, dorsal view. Scale bars: 2 mm (**A, B**); 0.5 mm (**C, D**).

Non-Australian *Hortophora* gen. nov. species

Hortophora capitalis (L. Koch, 1871), comb. nov.

Fig. 36A–C

Epeira capitalis Koch 1871: 58–59, plate 5, figs 1, 1a.

Epeira capitalis L. Koch.- Hogg 1899: 139–140, pl. 13, figs 3, 3a–d, 4b (misidentification; these records refer either *H. biapicata* comb. nov. or *H. transmarina* comb. nov.; see Remarks).

Araneus capitalis (L. Koch).- Berland 1924: 220; Berland 1938: 173, figs 129–130.

Type material. ***Holotype*** of *Epeira capitalis* L. Koch, 1871: Female, from Ovalau (17°41'S, 178°48'E, Fiji) ZMH ((Rack 1961)-catalogue no. 227). Examined.

Remarks. Dondale (1966) listed *Epeira capitalis* L. Koch, 1871 as junior synonym of *H. transmarina* comb. nov. and the holotype of this species from Fiji has therefore been examined as part of this study. Its current synonymy with *H. transmarina* comb. nov. cannot be confirmed as the epigyne base is narrow without visible baso-lateral flaps, much more like that of *H. biapicata* comb. nov. However, having not had the opportunity to examine topotypical males, the most prudent solution is to revalidate this species pending a revision of Pacific *Hortophora* gen. nov. The species is here transferred to *Hortophora* gen. nov. due to the similarities with the above-mentioned two species, thereby conforming to the generic diagnostic of

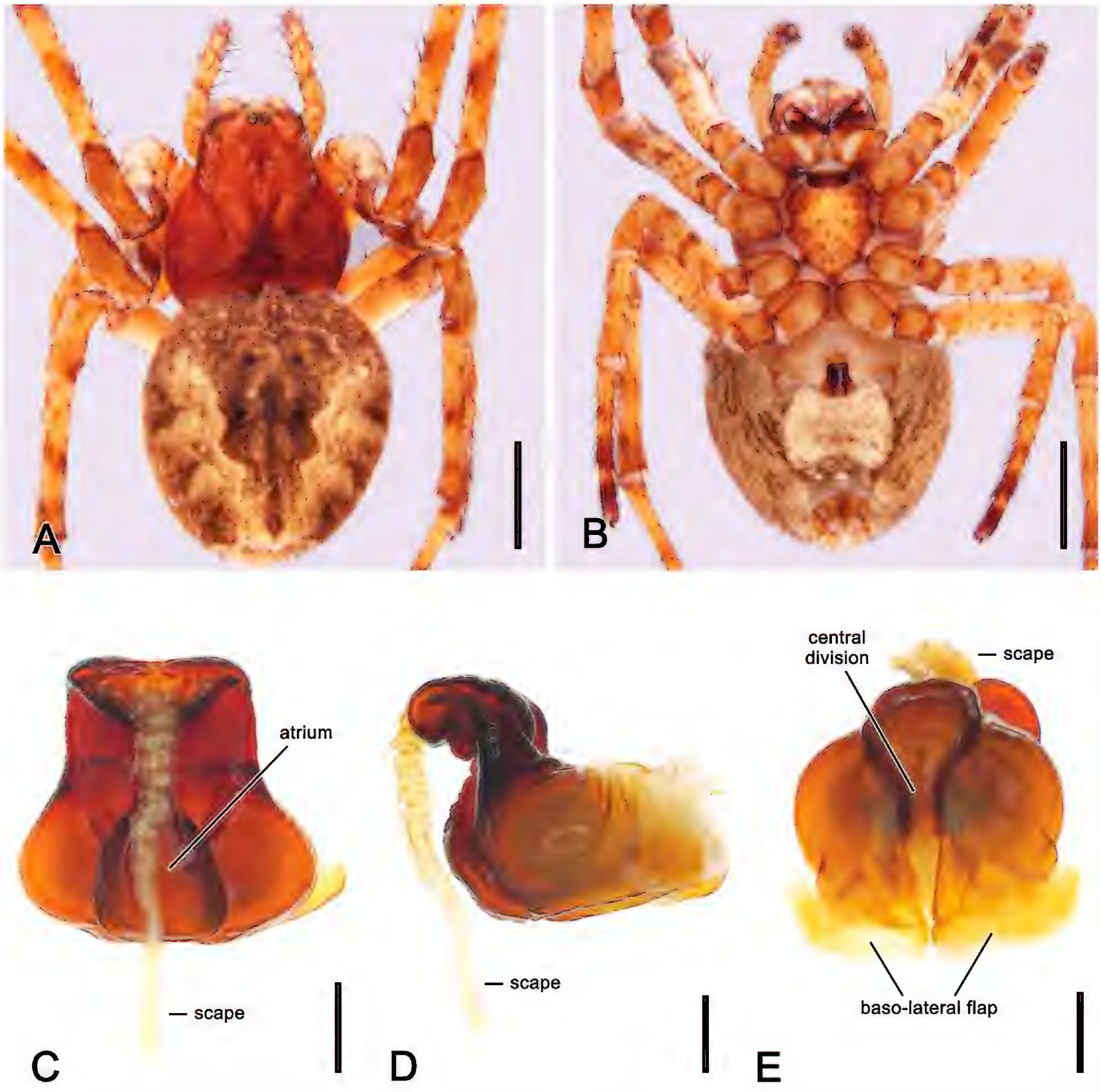

Figure 34. *Hortophora yesabah* sp. nov., female (QM S111897). **A.** dorsal habitus; **B.** ventral habitus; **C.** epigyne, ventral view; **D.** epigyne, lateral view; **E.** epigyne, posterior view. Scale bars: 2 mm (**A, B**); 0.2 mm (**C–E**).

Hortophora gen. nov., specifically the highly elongated epigyne scape (Fig. 36A–C).

Berland (1924) reported the *H. capitalis* comb. nov. from New Caledonia without specimen details, but differentiated it from *H. flavicoma* comb. nov. by somatic (colouration of the abdomen) and genitalic (length of epigyne scape) characters. Berland (1938) reported males and females of *H. capitalis* comb. nov. from the New Hebrides, now Vanuatu. Taking the similarities of female *Hortophora* gen. nov. into account, we caution to accept his identifications until males of the species from the type locality are known and their genitalia examined in detail. We did not examine Berland's (1938) material, likely deposited in Paris.

Hogg (1899) reported *H. capitalis* comb. nov. and *H. transmarina* comb. nov. (as *Epeira producta*) from near Cooktown in northern Queensland. He discusses the differences of these species and his *Epeira frostii* (= *H. biapicata* comb. nov.) in some detail and concludes that "*...the whole three species are, at most, local varieties of the same*". He stayed, however, short of synonymising them. Curiously, he illustrated the epigyne of both *H. capitalis* comb. nov. and *H. transmarina* comb. nov. in a single image (Hogg 1899, fig. 4b "Epigyne of *E. capitalis* and *E. producta*"). It is clear, that H.R. Hogg was unable to clearly delineate the two species, specifically as he did not examine mature males. It is also clear that his record of *H. capitalis* comb. nov. refers to either

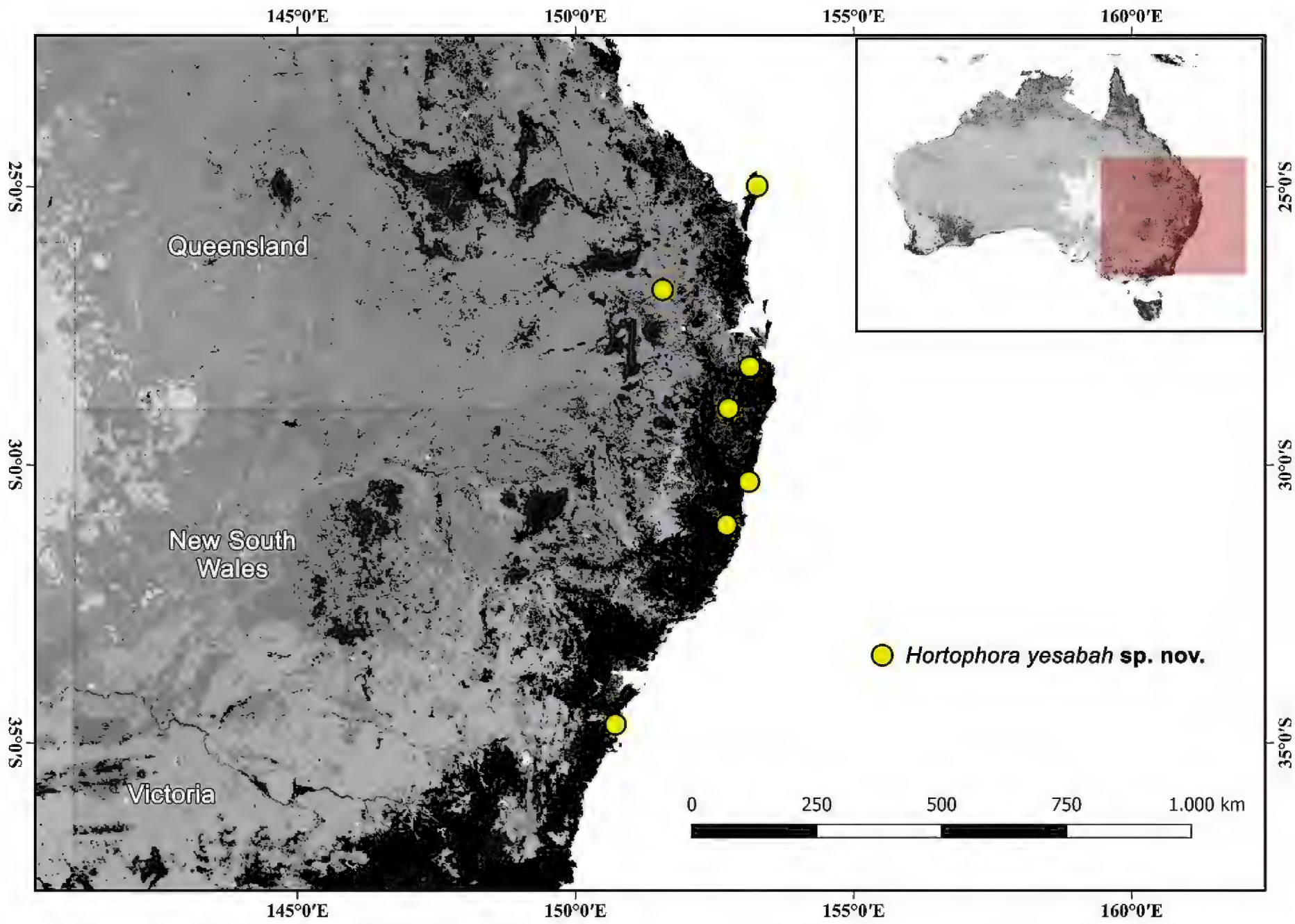

Figure 35. Distribution records of *Hortophora yesabah* sp. nov. in Australia.

H. biapicata comb. nov. or *H. transmarina* comb. nov. We found both species in Cooktown (see Appendix 1).

Hortophora flavicoma (Simon, 1880), comb. nov.

Epeira flavicoma Simon 1880: 168–169.

Araneus flavicoma (Simon).- Berland 1924: 220.

Eriophora flavicoma (Simon).- Archer 1951: 21.

Type material. Holotype of *Epeira flavicoma* Simon, 1880: Female, Canala (21°31'S, 165°57'E, New Caledonia), Coll. E. Simon (likely MNHN). Not examined.

Remarks. *Epeira flavicoma* Simon, 1880 was described based on a female from New Caledonia. Simon (1880) diagnosed the species at the time from *H. capitalis* comb. nov. by colour differences. Berland (1924) reported both species from New Caledonia, specifically the Loyalty Islands, and differentiated them both by colour and the length of the epigyne, being much longer in *H. flavicoma* comb. nov.

The detailed treatment of this species is not part of this project, but it is clear that Simon's (1880) original description and Berland's (1924) depiction of the species conforms to the diagnosis of *Hortophora* gen. nov., specifically with respect to the long epigyne scape. We therefore transfer the species to *Hortophora* gen. nov., *H. flavicoma* comb. nov., pending a revision of Pacific species of the genus.

Hortophora viridis (Keyserling, 1865), comb. nov.

Fig. 37A, B

Epeira viridis Keyserling 1865: 812–813, plate 18, figs 11, 12.

Type material. Holotype of *Epeira viridis* Keyserling, 1865: Female from Upolu (13°54'S, 171°44'E, Samoa) (NHM 1890.7.1.4237). Examined.

Remarks. *Epeira viridis* Keyserling, 1865 was synonymised with *H. transmarina* comb. nov. by Dondale (1966). This synonymy is rejected here in addition to other synonymies proposed by the author, including that of *H. transmarina* comb. nov. with *H. biapicata* comb. nov.

Dondale (1966) considered a female lodged in the ZMH as holotype of *Epeira viridis* Keyserling, 1865. This designation is here rejected as a female lodged in the NHM (NHM 1890.7.1.4237) much better matches the original description by Keyserling (1865). This is also consistent with a comment by Rack (1961, p. 25) who stated (from German) *"It is not clear if this is Keyserling's type, as L. Koch 1871, 84, also had specimens from Upolu"*.

Hortophora viridis comb. nov. is much unlike *H. transmarina* comb. nov., specifically based on the shape and colouration of the abdomen and details of the epigyne (Fig. 25A–C *vs* Fig. 37A, B). The long epigyne is consistent with *Hortophora* gen. nov. as diagnosed here and therefore the species is transferred to

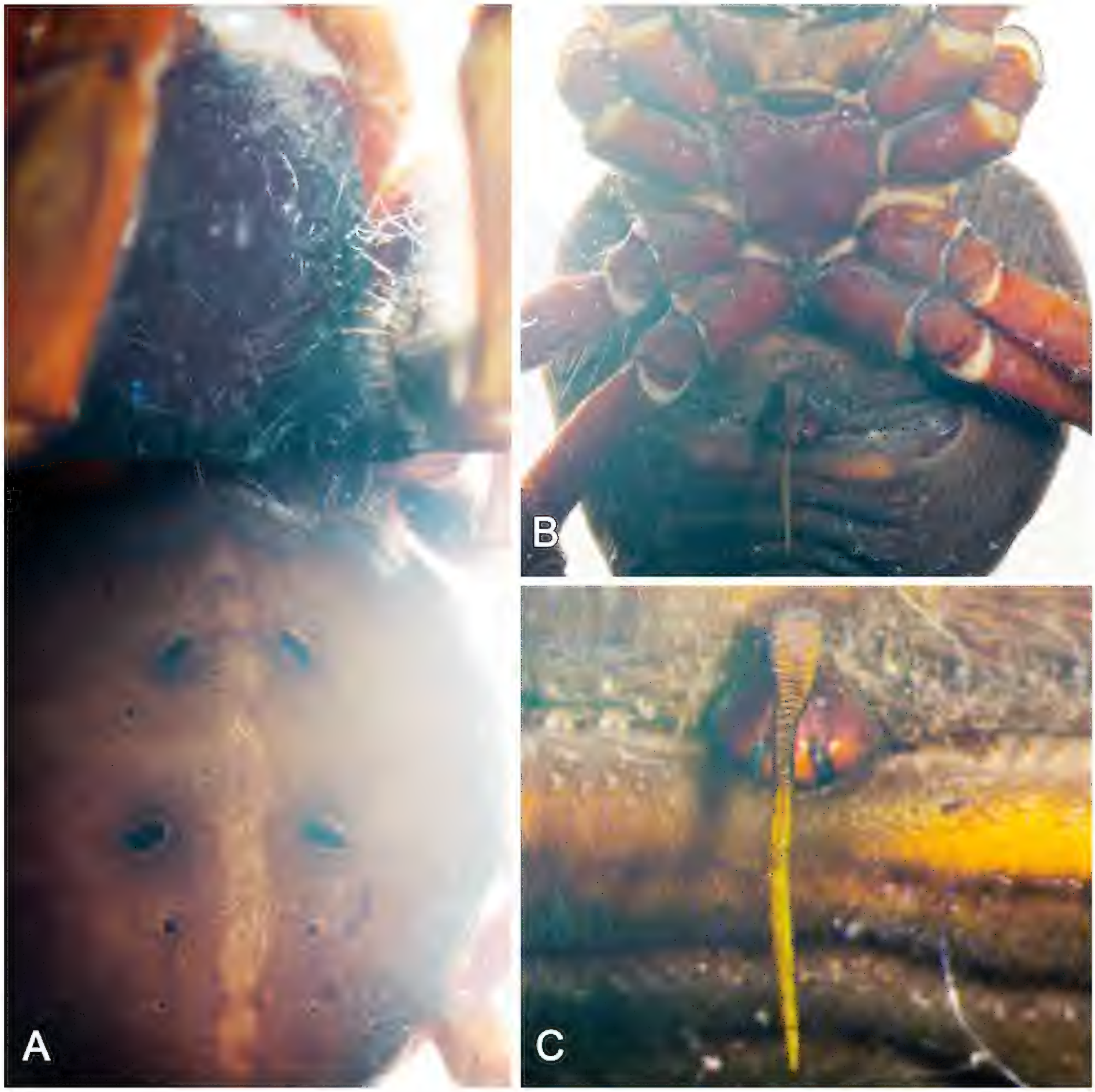

Figure 36. *Hortophora capitalis* comb. nov., holotype female from Ovalau (Fiji) ZMH (Rack (1961)-catalogue 227). **A.** dorsal habitus; B. ventral habitus; **C.** epigyne, ventral view.

the genus, *Hortophora viridis* comb. nov., pending an examination of males as part of a revision of Pacific *Hortophora* gen. nov.

Discussion

Hortophora gen. nov. includes largely Australian species with characteristic genital morphology. An elongated median apophysis with two apical, small protrusions is the most common male pedipalp configuration in the genus and occurs in those species with a very long epigyne scape. Amongst other backobourkiines with similar median apophyses, like for example *Backobourkia* and *Plebs*, the epigyne scape is likewise elongated (Framenau et al. 2010, Joseph and Framenau 2012). Similar patterns also occur in *Eriophora* and *Verrucosa* amongst the eriophoriines (*sensu* Schaff et al. 2020) (Levi 1971; Lise et al. 2015). Therefore, there may be a functional relationship between the length of the median apophysis and the length of the scape, although to our knowledge no study has explored this correlation. Very few studies have imaged genitalia during copulation in the Araneidae to explore the functional roles of the different pedipalp sclerites. For example, the median apophysis interlocks with the terminal pocket of the scape in *Larinia jeskovi* Marusik, 1987 (Mouginot et al. 2015), but the same mechanism is unlikely in *Hortophora* gen. nov. or other backobourkiine genera, as the scape does not have such a terminal pocket.

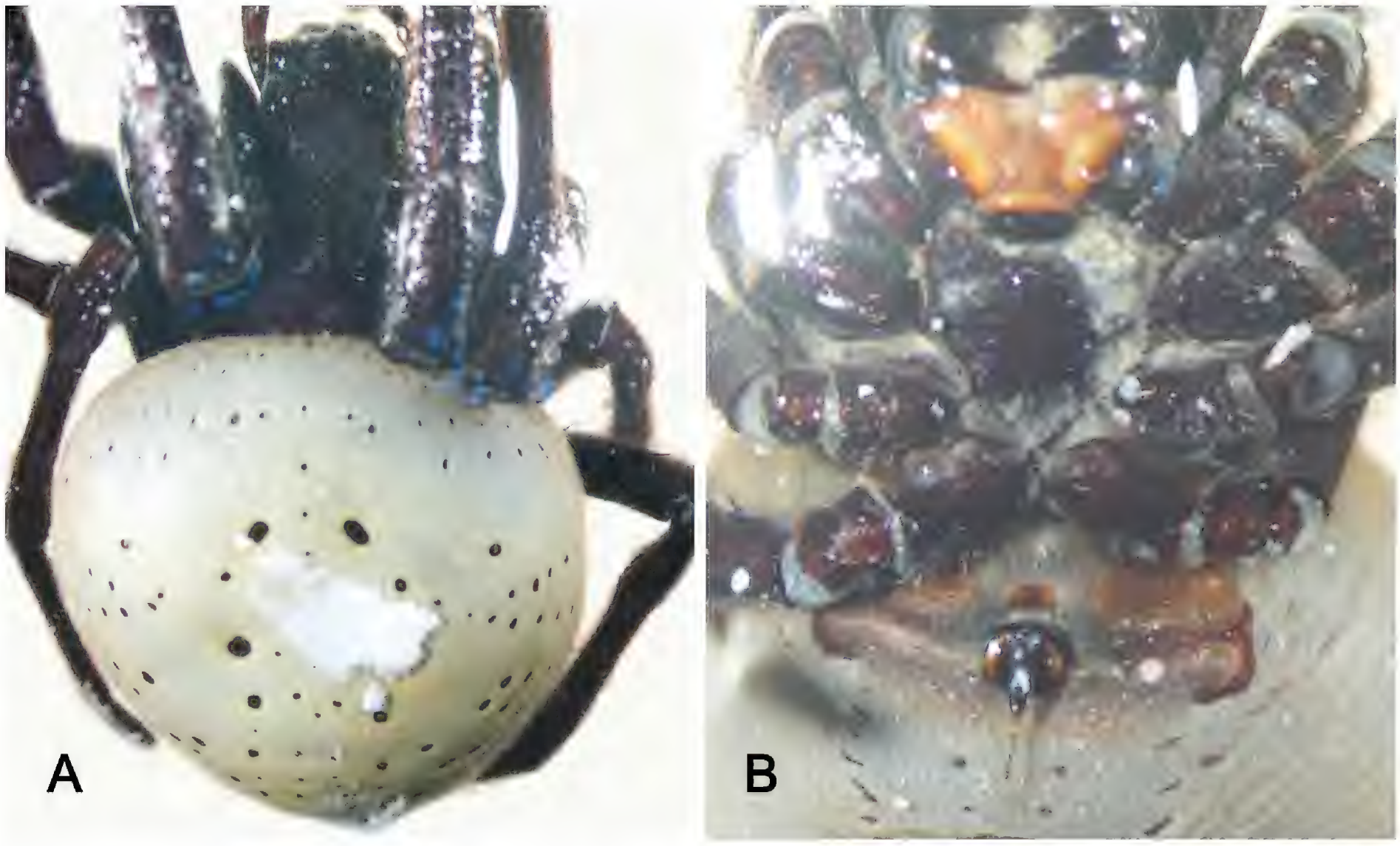

Figure 37. *Hortophora viridis* comb. nov., holotype female from Upolu (Samoa) (NHM 1890.7.1.4237). **A.** dorsal habitus; **B.** ventral habitus.

Mouginot et al.'s (2015) study explored the significance of female genital mutilation by males in *L. jeskovi*, i.e. males breaking off the epigyne scape during copulation. This is proposed to prevent follow-up matings by the female and thereby improves the male's reproductive fitness (Nakata 2016). Sexual cannibalism by females in turn functions as a counteradaptation to genital mutilation, i.e. if a female cannibalises the male before he can mutilate the scape, she improves her fitness by allowing multiple males to mate with her (Mouginot and Uhl 2019). Female genital mutilation is not uncommon in *Hortophora* gen. nov. and occurs in at least four species at various degrees (*H. megacantha* sp. nov. – 75% females with broken off scape; *P. porongurup* sp. nov. – 100%; *H. urbana* comb. nov. – 50%, *H. yesabah* sp. nov. - 20%). There is no apparent pattern between pedipalp and epigyne morphology and the incidence of female genital mutilation, which occurs in species with relatively long and short scapes. There also does not seem to be a clear pattern of female genital mutilation in other backobourkiines; it is very common in both species of *Novakiella* (Framenau et al. 2021), common in some species of *Plebs* (Joseph and Framenau 2012) but absent in *Backobourkia* and *Lariniophora* (Framenau et al. 2010; Framenau 2011). The backobourkiines may therefore serve as a suitable model taxon to explore factors affecting female genital mutilation as it is apparently spread amongst taxa of variable morphology and ecological preferences.

Hortophora lodicula comb. nov., *H. walesiana* comb. nov. and *H. yesabah* sp. nov. have comparatively short median apophyses and epigyne scapes, particularly in *H. walesiana* gen. nov. The inclusion of these species in *Hortophora* gen. nov. may therefore be considered tentative pending a comprehensive morphological and molecular phylogenetic study of the backoubourkiine spiders (*sensu* Scharff et al. 2020). However, in other aspects these species match the current diagnosis of *Hortophora* gen. nov., i.e. in the presence and shape of a conductor lobe in males in all three species and the presence of a bubble-shaped terminal apophysis at least in *H. walesiana* comb. nov. and *H. yesabah* sp. nov. In addition, overall morphological differences of these species to the remaining *Hortophora* gen. nov. species are less pronounced than to any other genus currently described in the backobourkiines and to others that are recognised as part of our current project, i.e. "NGEN02" and "NGEN05" in Scharff et al. (2020). Including those three species in *Hortophora* gen. nov. therefore appears to be the most conservative solution based on our morphological assessment pending a planned phylogenetic study of the backobourkiines.

The backobourkiines are a largely Australian clade with few genera also occurring outside the country. *Backobourkia*, *Novakiella* and *Lariniophora* are Australian endemics, with the exception of two species, *B. brounii* (Urquhart, 1885) and *N. trituberculosa* (Roewer, 1942), that occur in New Zealand and may be human-mediated introductions there (Framenau et al. 2010; Framenau et al. 2021). *Hortophora* gen. nov. and *Plebs* also have their centre of diversity in Australia with some

species of each genus occurring in the Oriental and Pacific regions. If an Australian origin of these genera is assumed, speciation is likely based on dispersal into these regions. The inferred age of the backobourkiines is somewhere between 41 and 77 Ma which suggests that this clade has diversified after Australia broke off from Antarctica some 85 Ma ago (Scharff et al. 2020). The only two backobourkiine genera that do not fit into this generalised biogeographic picture are *Carepalxis* and *Singa*. *Carepalxis* currently has a Gondwanan distribution (Australia/Papua New Guinea and the Nearctic/Neotropics), more consistent with a biogeographic origin prior to the break-up of Gondwana. However, the genus has not been revised in its entirety (Levi 1992). The type species of *Carepalxis*, *C. montifera* L. Koch, 1872, is Australian and further investigation is needed to assess whether New World species are indeed congeneric. *Singa* has a largely northern hemisphere and Afrotropical distribution and currently no species matching the diagnosis of the genus (i.e. Levi 1972) has so far been found in Australia (VWF pers. observation). Genital morphology also casts doubt on *Singa* being correctly placed in the backoubourkiines as the male pedipalp does not display the structures typical for the group (i.e. the pedipalp patella of *Singa* has two macrosetae and the median apophysis does not form an arch over the radix) (Levi 1972).

Solving biogeographic questions within *Hortophora* gen. nov. and the backobourkiines as a whole requires further taxonomic and phylogenetic studies. With respect to *Hortophora* gen. nov., future studies should concentrate on the Pacific *Hortophora* gen. nov., specifically the taxonomic treatment of males, and an evaluation of the phylogenetic position of *Hortophora* gen. nov. species with comparatively short median apophyses and epigyne scapes.

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Appendix 1

Material examined of *Hortophora* gen. nov.

***Hortophora biapicata* comb. nov.**

Material examined. **Australia: Australian Capital Territory:** 1 female, Canberra, 35°18'S, 149°08'E (AM KS3313); 3 females, same locality (QM S372); 1 female, Red Hill, 14 Pera Pl, 35°20'S, 149°08'E (WAM T70070). **New South Wales:** 1 female, 'Collaroy', Merriwa, 32°09'S, 150°21'E (AM KS34927); 1 female, Annangrove, 33°40'S, 150°56'E (AM KS3153); 1 female, Ardlethan, 34°22'S, 146°54'E (AM KS3146); 1 female, Auburn, 33°51'S, 151°02'E (MV K-2565); 1 male, Balmain, Sydney, 33°52'S, 151°11'E (AM KS6501); 1 female, Balmoral, Sydney, 33°40'S, 151°15'E (AM KS53339); 1 female, Balranald, 34°38'S, 143°34'E (AM KS34804); 1 female, Bankstown, 33°55'S, 150°59'E (AM KS34704); 1 female, Barmedman, 34°09'S, 147°23'E (AM KS34729); 1 male, 1 female, Barrier Highway, 4 km W of Oodla Wirra, 32°54'27"S, 137°02'10"E (AM KS77375); 1 female, Bathurst, 33°25'S, 149°35'E (AM KS69296); 1 female, Baulkham Hills, 33°45'S, 151°01'E (AM KS16726); 1 female, same locality (AM KS3286); 1 female, Beecroft, 33°45'S, 151°04'E (AM KS59037); 1 female, Bega, 36°41'S, 149°51'E (AM KS4541); 1 female, same locality (AM KS7301); 1 female, same locality (AM KS18714); 1 female, Belmore South, 33°55'S, 151°05'E (KS32950); 1 female, Bexley, 33°57'S, 151°07'E (AM KS3299); 1 female, Bingara, 29°52'S, 150°34'E (AM KS3302); 1 female, Blackmans Camp, Wurrumbungles, 31°23'S, 148°53'E (SAM); 1 female, Bondi Junction, 33°53'S, 151°15'E (AM KS3284); 1 female, Broken Hill, 31°58'S, 141°27'E (AM KS3145); 1 female, same locality (MV K-2540); 1 male, Caldwell, 35°37'S, 144°30'E (MV K-2531); 1 female, Canterbury, 33°56'S, 151°06'E (AM KS3148); 1 female, Caringbah, 34°02'S, 151°08'E (QM); 1 female, Carlton, Sydney, 33°58'S, 151°07'E (AM KS3310); 1 female, Chatswood, 33°48'S, 151°11'E (AM KS3247); 1 male, 1 female, Coffin Bay, 34°37'29"S, 135°28'18"E (AM KS77371); 1 female, Coffin Bay National Park, near entrance, 34°37'26"S, 135°27'04"E (AM KS77370); 1 male, Como, 34°01'S, 151°04'E (AM KS34009); 1 female, Condobolin, 33°05'S, 147°09'E (AM KS8818); 1 female, same locality (AM KS49114); 1 female, same locality (AM KS50422); 1 female, Coolah Valley, 31°50'S, 149°43'E (AM KS33392); 1 female, Cootamundra, 34°38'S, 148°02'E (AM KS4711); 1 male, Cowra, 33°50'S, 148°41'E (AM KS34395); 2 females, Crookwell, 34°28'S, 149°29'E (AM KS33517); 1 female, Dubbo, 32°15'S, 148°37'E (AM KS33508); 1 female, Dundas, 33°49'S, 151°02'E (AM KS3151); 1 female, Earlwood, 33°55'S, 151°08'E (AM KS3307); 1 female, East Maitland, 32°44'S, 151°35'E (AM KS51598); 1 male, Eastwood, 33°47'S, 151°06'E (AM KS3144); 1 female, same locality (AM KS33296); 2 females, Enfield, 33°53'S, 151°06'E (AM); 1 female, Guidford, near Sydney, 33°51'S, 150°58'E (AM KS3314); 1 female, Hawkesbury River, Freeman`s Beach near Windsor, 33°33'S, 150°47'E (AM KS9068); 1 female, Homebush, 33°52'S, 151°05'E (AM KS49874); 1 female, Hornsby, Waitara Creek, 33°42'52"S, 151°05'22"E (AM KS88781); 1 female, Hurstville, 33°58'S, 151°06'E (AM KS3308); 1 female, Inveresk, Morundah, 34°56'S, 146°23'E (AM KS33518); 1 female, Jackadgery, 29°34'S, 152°32'E (AM KS3248); 1 female, Katoomba, 33°43'S, 150°19'E (AM KS3303); 1 female, Kensington, Uni of NSW, 33°55'S, 151°13'E (AM KS40981); 1 female, Kingsgrove, 33°57'S, 151°06'E (AM KS1569); 1 female, Lake Victoria Station, via Wentworth, 34°04'S, 141°11'E (MV K-2586); 1 female, Lane Cove, Sydney, 33°49'S, 151°10'E (SAM); 1 female, Lidcombe, 33°52'S, 151°03'E (AM KS3309); 1 female, same locality (AM KS35040); 1 female, Lithgow, 33°29'S, 150°08'E (AM KS3297); 1 female, Maitland, 32°44'S, 151°33'E (AM KS10811); 1 female, Mandurama, 33°39'S, 149°05'E (AM KS3149); 1 female, Menindee, 32°24'S, 142°25'E (AM KS3147); 1 female, Moree, 29°28'S, 149°51'E (AM KS32591); 1 female, same locality (AM KS88791); 1 female, Mosman, 33°50'S, 151°15'E (AM KS4878); 1 female, Mt Pritchard, 33°54'S, 150°54'E (AM KS7697); 1 female, Mudgee, 32°36'S, 149°35'E (AM KS3152); 1 female, same locality (AM KS22793); 1 female, Murwillumbah, 28°20'S, 153°24'E (AM KS3263); 1 female, Naremburn, 33°49'S, 151°12'E (AM KS3305); 1 female, Newnes State Forest, Waratah Ridge Road, 1.4 km from Glowworm Tunnel Road, 33°23'45"S, 150°14'17"E (AM KS94537); 1 female, Newtown, 33°54'S, 151°11'E (AM KS3301); 1 female, North Sydney, 33°49'S, 151°12'E (AM KS3287); 1 male, 1 female, same locality (AM KS32850); 1 male, Orange, 33°17'S, 149°06'E (AM KS30848); 1 female, same locality (AM KS7478); 1 female, Paddington, Sydney, 33°53'S, 151°13'E (AM KS2970); 1 female, Parkes area, 33°08'S, 148°11'E (AM KS45846); 1 female, Putney, 33°50'S, 151°06'E (AM KS4495); 1 female, Putney, near Ryde, 33°50'S, 151°06'E (AM KS3316); 1 female, Queenscliff, near Manly, 33°47'S, 151°17'E (AM KS3264); 1 female, Reevesby, 33°57'S, 151°01'E (AM KS18767); 1 female, Roseville, 33°47'S, 151°12'E (AM KS50167); 1 male, Ryde, 33°49'S, 151°06'E (AM KS34022); 1 female, Smithfield, 33°51'S, 151°56'E (AM KS69298); 1 female, Springs Creek, Barrier Highway, 120 km E Broken Hill, 32°18'S, 140°50'E (SAM); 1 female, St Gorges Basin, 35°05'S, 150°35'E (AM); 1 female, Strathfield, 33°53'S, 151°04'E (AM KS3300); 1 male, same locality (AM KS34324); 1 female, Sydney, 33°52'S, 151°13'E (AM KS3274); 1 female, same locality (AM KS3298); 1 female, same locality (AM KS3306); 1 female, same locality (AM KS33323); 1 female, Tumut River, crossing between Gundagai and Brungle, 35°07'S, 148°13'E (SAM); 1 male, Turramura, 33°44'S, 151°08'E

(AM KS23508); 2 females, Wagga Wagga, Gregadoo Road, 35°07'S, 147°22'E (WAM T70040); 1 female, Wahronga, 33°43'S, 151°08'E (AM KS3315); 1 male, Wellington Caves, 32°37'S, 148°56'E (QM S17268); 1 female, West Ryde, 33°49'S, 151°05'E (AM KS14067); 1 female, Willoughby, 33°48'S, 151°12'E (AM KS3304); 1 female, Willows Tree, New England Highway, 31°40'S, 150°44'E (QM); 1 female, Woy Woy, 33°229'S, 151°20'E (AM KS3150); 1 female, Yancannia, NNE Broken Hill, 30°15'S, 142°46'E (MV K-2636); 1 male, 1 female, Yanco, 34°34'S, 146°21'E (SAM); 1 male, Yanco Creek, 11 km SW of Morundah, 35°02'S 146°13'E (WAM T70021); 1 female, Yass, 34°51'S, 148°55'E (AM KS16388); 1 female, same locality (AM KS30849). **Northern Territory:** 1 female, Alice Springs, 23°42'S, 133°42'E (AM KS41022); 1 female, Alice Springs, 23°42'S, 133°52'E (AM KS45095); 1 female, Alice Springs, 300 km NW, ?Mt Doreen, 21°57'S, 135°06'E (SAM); 1 female, Bitter Springs, 23°33'S, 134°27'E (SAM); 1 female, Borroloola, 16°04'S, 136°18'E (MV K-2577); 1 female, Pickertaramoor, Melville Island, 11°42'S, 131°01'E (SAM); 1 female, Trephina Gorge, 23°32'S, 134°24'E (QM S25687). **Queensland:** 1 male, 'Ouida', Morven, 26°25'S, 147°07'E (QM S35040); 1 female, 2 juv., Archer River Crossing, 13°25'S, 141°41'E (QM); 1 female, Aspley, 27°22'S, 153°01'E (QM); 1 female, Atherton Tablelands, Rose Gums, 17°18'44"S, 145°42'9"E (ZMDH 12371); 1 female, Blackbutt, 4 km along Crows Nest, 26°52'S, 152°11'E (QM S20902); 1 male, Boggomoss No. 19, via Taroom, 25°25'S, 150°01'E (QM S36202); 1 female, Brisbane, 27°28'S, 153°01'E (QM); 1 female, Burpengary, 27°09'S, 152°57'E (QM S61042); 1 female, Caigan, no exact locality (NHM 1890.7.1.4201); 1 female, Chermside West, 27°28'S, 153°01'E (QM S21647); 1 male, Chinchilla, 26°44'S, 150°38'E (QM); 1 female, Clohesy River Road, 5.2 km by road E of Kennedy Highway, 16°55'S, 145°36'E (AM KS53321); 1 female, College View, via Gatton, 27°34'S, 152°17'E (QM S370); 1 female, Condamine, 26°56'S, 150°08'E (AM KS33520); 1 female, Cooktown, Le Souef, 15°41'S, 145°07'E (MV K-2610); 1 female, Cooroy, 26°25'S, 152°55'E (QM); 1 female, Cunnamulla, 28°14'S, 145°41'E (QM); 1 male, Emerald, 23°31'S, 148°10'E (QM); 1 female, Fortitude Valley, 27°28'S, 153°01'E (QM); 1 male, Goondiwindi, 28°33'S, 150°18'E (QM S368); 1 female, Gordon Park, 27°25'S, 153°01'E (QM); 1 male, Ipswich, 27°38'S, 152°55'E (QM S4532); 1 female, Kangaroo Point, Brisbane, 27°28'S, 153°03'E (QM W435); 1 female, Karana Downs, Ipswich, 27°33'S, 152°49'E (QM S36806); 2 females, 1 juv., Kumbarilla, 28 mi W Dalby, 27°19'S, 150°53'E (QM S369); 1 female, same locality (QM); 2 females, Lake Broadwater, 27°21'S, 151°06'E (QM); 1 female, Longreach, 23°27'S, 144°15'E (QM S371); 1 female, Morningside, Brisbane, 27°28'S, 153°01'E (QM); 1 male, Mt Colliery, Farm Creek Valley, 28°17'S, 152°17'E (QM S367); 2 males, Mt Pleasant, Dalby, 27°10'S, 151°23'E (QM S366); 1 male, New Farm, Brisbane, 27°28'S, 153°03'E (QM); 2 females, Peak Downs, 23°04'S, 148°07'E (NHM 1915.3.5.1236-37); 1 female, 1 juv., Peak Downs, 22°56'S, 148°05'E (ZMH; Godeffroy label identification "*E. thyridota*"); 1 female, Pittsworth, 27°43'S, 151°38'E (QM); 1 female, Sandgate, 27°19'S, 153°04'E (QM); 1 female, Strathgordon, 14°41'S, 142°10'E (QM); 1 female, Tamborine National Park, Witches Falls, 27°27'56"S, 153°10'48"E (ZMDH 12376); 1 female, Toowoomba, 27°33'S, 151°58'E (QM); 1 female, Trinity Park, track to Earl Hill, via Reed Road, 16°47'59"S, 145°42'33"E (AM KS67055); 1 female, Warwick, 31°45'S, 148°46'E (AM KS33718); 1 female, same locality (QM); 1 female, Weltown, near Goondiwindi, 28°33'S, 150°18'E (QM); 1 female, Westmar, 64 km W, Mulga Scrub, 27°59'S, 149°07'E (QM S364); 1 male, Westmar, mulga scrub 64 km W, 27°59'S, 149°07'E (QM S361); 1 female, Wickham Park, 27°28'S, 153°01'E (QM); 1 female, Willows, CQ, 23°34'S, 147°25'E (QM S18791); 1 male, Winton, 22°23'S, 143°02'E (QM S362); 1 male, Woodridge, Brisbane, 27°28'S, 153°03'E (QM S365). **South Australia:** 1 female, Adelaide, 34°55'S, 138°36'E (SAM); 1 male, same locality (SAM); 1 female, same locality (SAM); 1 female, same locality (SAM); 1 female, same locality (SAM); 1 female, same locality (SAM); 1 female, same locality (SAM); 1 female, same locality (SAM); 1 female, same locality (SAM); 1 female, Adelaide, near, 34°55'S, 138°36'E (SAM); 1 female, Adelaide, western suburbs, no exact locality (SAM); 1 female, Aldgate, 35°01'S, 138°44'E (SAM); 2 females, Athelstone, Adelaide, 34°52'S, 138°42'E (SAM); 1 female, Baird Bay, 33°08'51"S, 134°21'48"E (WAM T62530); 1 female, Baird Bay, 33°09'S, 134°22'E (WAM T73537); 1 female, Beautiful Valley Caravan Park, adjacent, near Wilmington, 32°39'S, 138°06'E (SAM); 1 female, Belair, 35°00'S, 138°38'E (SAM); 1 male, Belair National Park, Saddle Hill Road, 35°00'44"S, 138°40'31"E (AM KS76394); 1 female, Blair Athol, 34°52'S, 138°36'E (SAM); 1 female, Blanchetown, W of, at Goyders Line marker on Highway, 34°21'S, 139°37'E (SAM); 3 females, Bunyeroo Creek, ABC Range, 31°25'S, 138°32'E (SAM); 1 female, Bunyeroo Gorge, Heysen Range, 31°25'S, 138°32'E (SAM); 1 female, Carrappee Hill Conservation Park, 33°27'S, 136°16'E (SAM); 1 female, Ceres, Furner, no exact locality (SAM); 1 male, 1 female, Charlton Gully, 34°33'S, 135°47'E (SAM); 1 female, Christies Beach, 37°28'S, 140°23'E (SAM); 1 female, Clements Gap Conservation Park, 33°29'00"S, 138°04'10"E (SAM); 1 male, 1 female, Coffin Bay, behind caravan park, 34°36'S, 135°28'E (SAM); 1 female, College Park, 34°55'S, 138°37'E (SAM); 1 female, Comet Bore, S of Pinnaroo, 35°15'S, 140°56'E (SAM); 1 female, Cook, 21 km N, 30°26'S, 130°22'E (SAM); 1 male, Coromandel Valley, 35°03'S, 138°44'E (SAM); 1 female, Cortina Station, near Coorong, near Kingston SE, 36°49'S, 139°51'E (SAM); 1 female, Craddock, no exact locality (SAM); 4 females, Cutana Station, 32°13'S, 140°35'E (MV K-2570–3); 1 female, 1 juv., Dog Lake Road, SE

Langhorne Creek, 35°22'S, 139°04'E (SAM); 1 female, Edwardstown, Adelaide, 34°58'S, 138°34'E (SAM); 1 female, same locality (SAM); 1 female, same locality (SAM); 1 female, Elliston Special Rural School, 33°39'S, 134°53'E (SAM); 1 female, Ferryden Park, Adelaide, 34°52'S, 138°33'E (SAM); 1 male, Flagstaff Hill, 35°03'S, 138°35'E (SAM); 1 female, Flinder Monument and Stanford Beach parking area, Port Lincoln National Park, 34°47'S, 135°56'E (SAM); 1 female, Fullarton, 34°57'S. 138°37'E (ZMDH 12381); 1 female, Gawler Ranges National Park, track SW of Paney Homestead, 32°45'15"S, 135°32'17"E (AM KS76423); 1 female, Gilbert River, Riverton, 34°09'S, 138°44'E (NHM 1924.III.1.376); 1 male, Glenelg North, 34°58'S, 138°31'E (SAM); 1 female, Glenelg, RVS644, 34°59'S, 138°31'E (SAM); 1 female, Glenunga, 34°57'S, 138°38'E (SAM); 1 female, Grange, Adelaide, 34°54'S, 138°29'E (SAM); 1 female, Greenock, 3 km S, 34°27'S, 138°56'E (SAM); 1 male, Hahndorf, 35°02'S, 138°49'E (AM KS16236); 1 female, Hamley Bridge, 34°22'S, 138°40'E (SAM); 1 female, Hawthorn, Adelaide, 34°58'S, 138°36'E (SAM); 1 male, Hectorville, Adelaide, 34°54'S, 138°40'E (SAM); 1 female, Heywood Park, 34°58'S, 138°36'E (SAM); 1 female, Hyde Park, Adelaide, 34°57'S, 138°36'E (SAM); 1 female, same locality (SAM); 1 male, 1 female, Inman Valley, 35°28'S, 138°27'E (SAM); 1 female, Jervois, N of Wellington, 35°16'S, 139°26'E (SAM); 1 female, Jimmys Well, 3 km S, Mt Rescue Conservation Park, 35°52'S, 140°18'E (SAM); 1 female, Kangaroo Island, 35°45'S, 137°37'E (SAM); 1 male, same locality (SAM); 1 female, Kappawanta Basin, 33°40'S, 135°22'E (SAM); 1 female, Keith, 36°06'S, 140°21'E (SAM); 1 female, Kingscote, Kangaroo Island, 35°39'S, 137°38'E (SAM); 1 female, same locality (SAM); 1 female, Kirton Point, Port Lincoln, 34°43'S, 135°52'E (SAM); 2 males, 1 female, same locality (SAM); 1 male, Langhorne Creek, 35°18'S, 139°02'E (SAM); 1 female, Lincoln National Park, Woodcutters Beach Campsite, 34°47'11"S, 135°55'04"E (AM KS77374); 1 female, Lockleys, Adelaide, 34°55'S, 138°32'E (SAM); 1 female, same locality (SAM); 1 male, same locality (SAM); 1 female, Loxton, 34°27'S, 140°34'E (SAM); 1 female, same locality (SAM); 1 female, Mambray Creek, 32°51'S, 137°57'E (AM KS10240); 1 female, Mansfield Park, 34°51'S, 138°33'E (SAM); 1 female, same locality (SAM); 1 female, Melrose Camping area, 32°49'S, 138°11'E (SAM); 1 female, Millbrook Reserve, 34°49'00"S, 138°48'30"E (SAM); 1 female, Minnipa, 32°51'S, 135°09'E (WAM T70014); 1 male, Mitcham, 34°59'S, 138°37'E (SAM); 1 male, same locality (SAM); 2 males, same locality (SAM); 1 male, same locality (SAM); 1 female, same locality (SAM); 1 male, same locality (SAM); 1 female, same locality (SAM); 1 female, same locality (SAM); 1 female, same locality (SAM); 1 male, Mitchell Park, 10°40'S, 152°43'E (SAM); 1 female, Moonta, Yorke Peninsula, 34°03'S, 137°35'E (SAM); 4 females, Mt Lofty, 34°58'S, 138°42'E (SAM); 2 females, Murnpeowie Homestead, 29°35'S, 139°03'E (MV K-2584–5); 1 female, Murray Bridge, 35°07'S, 139°16'E (SAM); 1 male, 3 females, Murrunatta Conservation Park, 34°32'S, 135°36'E (SAM); 2 females, Naracoorte Cave Reserve, 37°05'S, 140°47'E (SAM); 1 female, Naracoorte Caves Conservation Park, 37°02'S, 140°48'E (WAM T70067); 1 female, Netley, 34°57'S, 138°33'E (SAM); 1 male, Ngarkat Conservation Park, 35°38'17"S, 140°46'50"E (AM KS76376); 1 female, Ngarkat Conservation Park, border track 6 km E Kirra, 35°46'16"S, 140°57'40"E (SAM); 1 female, same locality (SAM); 1 female, Norwood, Adelaide, 34°55'S, 138°38'E (SAM); 1 female, same locality (SAM); 1 female, Orroroo, river picnic area, 32°44'05"S, 138°36'34"E (SAM); 1 male, Para Hills, 34°49'S, 138°40'E (SAM); 1 male, same locality (SAM); 1 female, Peebinga Conservation Park, 33 km NNW Pinnaroo, 34°59'16"S, 140°48'12"E (SAM); 1 female, Point Sturt, Lake Alexandrina, 35°29'S, 138°57'E (SAM); 1 male, Port Noarlunga, 35°09'S, 138°28'E (SAM); 1 female, Proper Bay, Tulka, 34°48'S, 135°48'E (AM KS33554); 1 female, Pyap, near, 34°27'S, 140°31'E (SAM); 1 female, Richmond, 34°56'S, 138°33'E (SAM); 1 male, 1 female, River Murray, between Blanchetown and Swan Reach, 34°27'S, 139°39'E (SAM); 1 female, River Murray, near Blanchetown, 34°21'S, 139°39'E (SAM); 1 female, Rostrevor area, 34°54'S, 138°42'E (SAM); 1 female, Roxby Downs, 30°34'S, 136°54'E (SAM); 1 male, Salisbury East, 34°46'S, 138°39'E (AM KS32115); 1 female, Semaphore, 34°50'S, 138°29'E (AM KS33354); 1 female, Serpentine Lakes, 28°30'32"S, 129°00'E (SAM); 1 female, Sinclair Gap Salt Lake, 33°07'30"S, 137°03'20"E (SAM); 1 female, Sleaford Bay, Port Lincoln, 34°51'S, 135°50'E (SAM); 1 female, South Plympton, 34°59'S, 138°33'E (SAM); 1 female, St Marys, Adelaide, 35°00'S, 138°35'E (SAM); 1 male, St Peters, Adelaide, 33°55'S, 151°11'E (AM KS32103); 1 female, same locality (AM KS32105); 1 female, Stevenson River, 27°06'S, 135°32'E (MV K-931); 1 female, Sturt, Adelaide, 35°01'S, 138°33'E (SAM); 1 female, Taperoo, 34°48'S, 138°30'E (SAM); 1 female, Thebarton, Adelaide, 34°55'S, 138°34'E (SAM); 1 female, Tod River mouth, N of Port Lincoln, 34°35'S, 135°54'E (SAM); 1 female, Tununda and Murray Flats, 34°31'S, 138°58'E (SAM); 1 male, 1 female, Tusmore, Adelaide, 34°56'S, 138°38'E (SAM); 1 female, unknown (Royal Adelaide Hospital, bite), no exact locality (SAM); 1 female, Unley Park, Adelaide, 34°58'S, 138°36'E (SAM); 1 female, same locality (SAM); 1 male, Vale Park, Adelaide, 34°53'S, 138°37'E (SAM); 1 female, Walkerville, Adelaide, 34°53'S, 138°37'E (SAM); 1 female, same locality (SAM); 1 female, Walleroo, Yorke Peninsula, 33°56'S, 137°38'E (SAM); 1 female, West Beach, Adelaide, 34°57'S, 138°30'E (SAM); 1 female, Wharminda Wells, 33°57'S, 136°14'E (SAM); 1 female, Wilpena Pound, 31°33'S, 138°34'E (SAM); 1 female, Wilpena Pound, Wilpena Creek, 31°33'S, 138°34'E (SAM); 1 female, Windsor Gardens, Adelaide, 34°52'S, 138°39'E (SAM); 1 female, Woomera, 31°10'S, 136°49'0E (SAM); 1 female, Wynbring Rocks, 20 mi W, 30°36'S,

133°45'E (MV K-2608). **Victoria:** 1 female, Avenel, 36°54'S, 145°14'E (MV K-2592); 2 females, same locality (MV K-2595); 3 females, Bacchus Marsh, Baker's property, 37°40'S, 144°26'E (WAM T70061); 1 female, Balwyn, 37°49'S, 145°04'E (MV K-2562); 1 male, Balwyn, 24 Yandilla St, 37°48'S, 145°04'E (WAM T70076); 1 female, Bendigo, 36°46'S, 144°17'E (MV K-2603); 1 female, Broughton, near, 30 km N Kaniva, 36°09'S, 141°21'E (SAM); 1 male, Brunswick, 37°46'S, 144°57'E (MV K-2605); 1 female, Bundoora, 37°41'S, 145°03'E (MV K-2602); 1 female, Burnley Gardens, 37°49'S, 145°E (MV K-2569); 1 female, Camberwell, 37°50'S, 145°04'E (MV K-2582); 1 female, Castlemaine, 37°04'S, 144°13'E (AM KS20286); 1 female, Chiltern, 36°09'S, 146°36'E (MV K-2609); 1 female, Churchill, 38°18'S, 146°21'E (SAM); 1 female, Clayton South, 37°56'S, 145°07'E (WAM T70065); 1 female, Dandenong, 37°59'S, 145°12'E (MV K-2558); 1 female, same locality (MV K-2574); 1 female, same locality (MV K-2597); 1 female, Dermodys Camp, Avon River State Forest, 37°48'S, 146°55'E (WAM T68041); 1 female, Dimboola, 36°26'S, 142°01'E (NHM 1924.III.1.1529); 1 female, Echuca, 36°08'S, 144°45'E (MV K-2594); 1 male, Elwood, 37°53'S, 144°59'E (MV K-2532); 1 female, Fawkner, Melbourne, 37°42'S, 144°58'E (MV K-2591); 1 female, Glen Iris, 37°51'S, 145°03'E (WAM T70060); 1 female, Hawthorn, 37°49'S, 145°02'E (MV K-2567); 1 female, Ivanhoe, 37°46'S, 145°02'E (MV K-2563); 1 female, same locality (MV K-2600); 1 female, Kew, 37°49'S, 145°03'E (AM KS28619); 1 female, Keysborough Telephone Exchange, 37°59'S, 145°10'E (WAM T70062); 1 female, Mallee Scrub, Western District, 36°10'S, 146°54'E (MV K-2561); 2 females, Malvern, 6 Newington Grv, 37°51'S, 145°02'E (WAM T70064); 1 female, Melbourne, 37°49'S, 144°58'E (MV K-2576); 1 female, Melbourne, near, 37°49'S, 144°58'E(MV K-2575); 1 female, Melton, 37°40'S, 144°34'E (MV K-2604); 2 females, Merbein, 37°40'S, 144°34'E (AM KS30554); 1 female, Mildura, 34°10'41"S, 142°07'43"E (SAM); 1 male, 1 female, Mildura, near Apex Park, 34°10'53"S, 142°9'26"E (WAM T68036); 1 female, Morrisons, 37°46'S, 144°06'E (MV K-2581); 1 male, Morwell, 38°14'S, 146°24'E (MV K-2527); 1 female, Narracan, 38°15'S, 146°13'E (MV K-2728); 1 female, Newbridge, 36°44'S, 143°53'E (MV K-2539); 1 female, North Balwyn, 37°47'S, 145°04'E (MV K-2568); 1 female, North Carlton, 37°47'S, 144°58'E (WAM T70066); 1 female, Nunawading, 37°49'S, 145°10'E (MV K-2593); 1 female, Oakleigh, 40 Darling St, 37°54'S, 145°06'E (WAM T70063); 1 female, Oxley, 36°26'S, 146°23'E (MV K-2537); 1 female, Pascoe Vale, 37°43'S, 144°56'E (MV K-2607); 2 males, Purnong (?Purnim), 38°16'S, 142°37'E (MV K-2535-6); 1 female, Ringwood, 37°48'S, 145°13'E (MV K-2606); 1 female, South Brighton, 37°54'S, 144°59'E (MV K-2533); 1 male, Springvale, 37°56'S, 145°09'E (MV K-2530); 1 male, Swan Hill, 35°20'S, 143°33'E (MV K-2599); 1 female, Warrack, 37°21'S, 141°34'E (MV K-2589); 1 female, West Heidelberg, 37°44'S, 145°02'E (MV K-2544); 2 females, Windsor, 37°43'S, 145°04'E (MV K-2551–2). **Western Australia:** 2 males, Albany, 35°01'S, 117°53'E (WAM T68098); 1 female, same locality (WAM T70072); 1 female, Albany, 35°02'S, 117°53'E (WAM T70043); 1 female, same locality (WAM T70111); 1 female, ALCOA minesite and forests, N and NW of Jarrahdale, 32°16'S, 116°06'E (WAM 97/517); 1 male, Applecross, 31°59'21"S, 115°55'43"E (WAM 78/1); 1 male, same locality (WAM 78/14); Applecross, 32°S, 115°50'E, 1 female, same locality (WAM T65681); 2 females, same locality (WAM T65684); 3 females, 4 juv., same locality (WAM T67936); 1 female, same locality (WAM T67948); 1 male, Applecross, 31°59'S, 115°56'E (WAM T70036); 1 male, Ardross, 27A Leverburgh St, 32°01'S, 115°50'E (WAM T70023); 1 female, Australind, 33°17'S, 115°42'E (WAM T68082); 1 female, Balladonia, via Norseman, 32°28'S, 123°52'E (AM KS33372); 1 male, Ballajura, 31°50'S, 115°53'E (WAM T68085); 1 male, Banganup Lake, 32°10'S, 115°49'E (WAM T70042); 1 female, Bassendean, 31°54'S, 115°56'E (WAM T67942); 2 females, Bedford, 31°54'S, 115°53'E (WAM T68001); 1 male, Bedford Park, 31°04'S, 115°53'E (WAM 77/489); 1 female, Belmont, 31°56'S, 115°55'E (WAM T67941); 1 female, same locality (WAM T67980); 1 female, Bettie Crossing, 27°29'S, 114°19'E (WAM T67952); 1 female, Bicton, 32°01'S, 115°47'E (WAM T67945); 1 male, Boddington, SW of, Worsley Alumina, Overland conveyor belt #1, 33°02'S, 116°12'E (WAM T77043); 1 female, Boulder, 30°46'S, 121°29'E (WAM T67954); 1 female, Broome, 17°57'S, 122°14'E (WAM T70080); 1 male, Bunbury, 33°20'S, 115°38'E (WAM 78/6); 1 female, Busselton, 33°38'S, 115°20'E (WAM T67947); 1 female, 1 juv., Canning Well, 22°22'S, 121°18'E (MV K-2553-4); 1 female, Cape Le Grand Road, 1.8 km N. of national park border, 33°54'S, 122°18'E (WAM T76101); 1 female, Capel, 33°33'S, 115°33'E (WAM T71604); 1 male, same locality (WAM T71605); 1 male, same locality (WAM T71609); 1 male, same locality (WAM T71610); 1 female, Charles Darwin Reserve, near dam, 29°28'04"S, 117°03'36"E (WAM T97768); 1 female, Chittering and Pearce, between, 30°30'S, 116°00'E (WAM T68022); 3 females, Collie River, near Bunbury, 33°20'S, 115°38'E (WAM T68003); 1 male, Collie, 46 Palmer Road, 33°22'S, 116°09'E (WAM T68028); 1 female, Coolbinia, 31°54'S, 115°51'E (WAM T67992); 1 male, Cooleenup Island, Yunderup, 32°34'S, 115°46'E (WAM T70002); 1 female, Coolgardie, 71 Forrest St (WAM T68077); 1 male, Corrigin, 12 km W, 32°21'S, 117°44'E (WAM T70090); 1 male, Crawley, University of Western Australia, 31°59'S, 115°49'E (WAM T73582); 1 female, 3 juv., Darling Range, 31°24'15.8"S, 115°59'51.7"E (NHM 1892.6.12.4–20); 1 female, 1 juv., Darlington, 31°54'S, 116°04'E (WAM T67938); 1 male, same locality (WAM T70004); 1 male, same locality (WAM T70078); 2 females, same locality (WAM T77189); 1 female, Dongara, 29°15'S, 114°55'E (WAM T65683); 1 male, Doodlakine-Kununoppin Road, ca. 15 km NW of Doodlakine,

31°29'S, 117°50'E (WAM T68079); 1 male, Doubleview, 31°54'S, 115°47'E (WAM T70039); 1 male, Dudley Park, 32°32'S, 115°43'E (WAM T68084); 1 female, East Perth, 31°57'S, 115°52'E (WAM T67998); 1 male, East Perth, Summer St, 31°57'S, 115°51'E (QM S20309); 1 female, same locality (QM S20310); 1 female, Eneabba, cave nearby, 29°49'S, 115°16'E (AM no reg.); 1 male, Eyre Bird Observatory, 32°14'35"S, 126°17'47"E (WAM T62531); 1 female, same locality (WAM T62532); 1 female, 1 juv., Fitzgerald River National Park, 34°04'S, 119°25'E (WAM T70071); 1 female, Floreat Park, 31°56'S, 115°47'E (WAM T65695); 1 female, same locality (WAM T68074); 1 female, same locality (WAM T67944); 1 male, Forrestfield, 31°58'S, 115°58'E (WAM T70018); 1 female, Fraser Range, W side, 32°03'20"S, 122°43'33"E (SAM); 1 female, Fremantle, 32°03'S, 115°44'E (WAM T67977); 1 female, same locality (WAM T68002); 1 female, same locality (WAM T68076); 1 female, same locality (WAM 30/363); 1 female, Garden Island, 32°12'S, 115°40'E (WAM T68069); 1 female, Gelorup, Lot 101 Gelorup Rise, 33°23'S, 115°38'E (WAM T68086); 1 male, same locality (WAM T70041); 2 females, 7 juv., Geraldton, 28°46'S, 114°37'E (AM KS32846); 1 female, same locality (WAM T101103); 1 female, Geraldton, Brand Highway, 28°46'S, 114°37'E (WAM T70052); 1 female, Geraldton, Drew Street, 28°46'S, 114°36'E (WAM T70027); 1 female, Geraldton, truckbay nearby, 28°46'S, 114°36'E (WAM T67985); 1 female, Gidgegannup, 31°48'S, 116°11'E (WAM T77194); 1 male, same locality (WAM T70009); 1 female, Glen Forrest, 31°54'S, 116°06'E (WAM T65689); 1 female, same locality (WAM T67983); 1 female, Gleneyle Station, camp, 0.5 km N of h/s, 25°16'S, 122°03'E (T145339); 1 female, Goomaling, 31°18'S, 116°49'E (WAM 25/807); 2 females, Greenmount, 31°51'S, 116°03'E (WAM T70068); 1 female, Guildford, 31°54'S, 115°58'E (WAM 14/199); 1 female, Guildford, 63 Helena St, 31°54'S, 115°58'E (WAM T70272); 1 female, Gwambigyne Pool Reserve, near York, 31°59'27"S, 116°14'15"E (WAM T102792); 1 female, Harvey, 33°05'S, 115°54'E (WAM T70046); 1 female, Harvey Agricultural area, 33°59'S, 115°47'E (AM KS32666); 1 female, 2 juv., same locality (AM KS3311); 1 female, Henty Brook, lot 21 Crampton Road, 33°20'S, 115°49'E (WAM T77196); 1 female, Herdsman Lake, 31°55'S, 115°48'E (WAM T68062); 1 female, Hovea, 31°52'S, 116°06'E (WAM T70037); 1 female, Inglewood, 31°55'S, 115°52'E (WAM T68011); 1 male, same locality (WAM T70015); 1 male, 1 female, 2 juv., Irrunytju Rockhole, 26°07'S, 128°58'E (WAM T67937); 1 female, Irwin River, Brand Highway, 7 km E Dongara, 29°25'S, 115°01'E (AM KS14945); 1 female, Jarrahdale, 32°20'S, 116°03'0E (WAM T67939); 1 female, Jarrahdale Mine (ALCOA), 32°16'S, 116°06'E (WAM T48213); 1 female, Jerramungup, 14 mi, 33°56'S, 118°50'E (WAM T67950); 1 female, Joondanna, 157 Baden St, 31°54'S, 115°50'E (WAM T68070); 1 female, Kalamunda, 45 Dixon Road, 31°58'S, 116°03'E (WAM T68080); 2 females, 1 juv., Kalamunda, E of Perth, 31°59'S, 116°03'E (QM); 1 female, Kalgoorlie, 30°45'S, 121°27'E (WAM T68013); 1 female, same locality (WAM T68017); 1 female, Kalgoorlie, Museum of the Goldfields, 30°44'S, 121°28'E (WAM T70034); 1 female, Karrinyup, 31°52'S, 115°47'E (WAM 77/490); 1 male, Katanning, 56 Beaufort St, 33°41'S, 117°35'E (WAM T73656); 1 female, Kings Park, 31°58'S, 115°50'E (WAM T70159); 1 female, Kitchener, 5 km W, W edge of Nullarbor Plain, 31°02'15"S, 124°08'35"E (WAM T68078); 1 female, Lake Cronin, 32°23'10"S, 119°45'05"E (WAM T67997); 1 male, Lake Jasper, 34°23'S, 115°40'E (WAM T70022); 1 female, Lake Lefroy, near southern end, 31°21'50"S, 121°40'42"E (WAM T70185); 2 females, Lake Magenta, 33°24'S, 119°15'E (WAM T68023); 1 female, Lake Magenta Reserve, near Greenshield Soak, 34°35'S, 119°06'E (WAM T68026); 1 female, Lake Poorginup, 34°33'S, 116°55'E (WAM T68096); 3 females, same locality (WAM T70005); 1 female, Laurier, near Gnowangerup, 34°02'S, 118°20'E (WAM T68004); 1 female, Leonora, 28°53'S, 121°19'E (WAM T67995); 1 female, 1 juv., Lesmurdie, 32°00'37"S, 116°02'49"E (WAM T68095); 1 female, Lucky Bay Camp Ground, Cape Le Grande National Park, 33°59'28"S, 122°10'13"E (WAM T70189); 1 female, Mandurah, 32°31'S, 115°43'E (WAM T65682); 1 female, same locality (WAM T67986); 2 females, 1 juv., Manjimup, 34°14'S, 116°08'E (WAM T67988); 1 female, same locality (WAM T68025); 1 female, same locality (WAM T73655); 1 female, Manjimup Motor Inn, Manjimup, 34°15'S, 116°09'E (WAM T70026); 2 females, Margaret River district, 33°57'S, 115°04'E (WAM 14/1014–5); 1 male, Marmion, 31°50'S, 115°45'E (WAM T70006); 1 male, Maylands, 31°55'S, 115°53'E (WAM T70024); 1 female, McAlinden, Collie, 40 km E, McAlinden Road, 33°35'S, 116°19'E (WAM T85270); 1 female, Messengers Patch, 50 km SE Yalgoo, 28°51'S, 117°06'E (WAM T67989); 1 male, Morangup Road, 31°41'S, 116°19'E (WAM T74726); 2 females, Mount Lawley, 31°55'S, 115°52'E (WAM T65693); 1 female, Mt Barker, 34°37'S, 117°40'E (WAM T70044); 1 female, Mt Cooke, 32°25'S, 116°18'E (WAM T70031); 1 male, same locality (WAM T70008); 1 male, Mt Hawthorn, 31°55'S, 115°50'E (WAM T68097); 1 female, Mt Lawley, 31°55'S, 115°52'E (WAM T67943); 1 female, same locality (WAM T67994); 1 female, same locality (WAM T68000); 1 male, same locality (WAM T68099); 1 female, Mt Manypeaks, via Albany, 34°50'S, 118°10'E (WAM T67979); 1 female, Mt Pleasant, 28°51'S, 114°53'E (WAM T70032); 1 female, same locality (WAM T68006); 1 male, same locality (WAM T101106); 1 female, same locality (WAM T101107); 1 female, Mundaring, 31°54'S, 116°10'E (WAM T73542); 1 female, same locality (WAM T87178); 1 female, Mundaring Forestry Reserve, 31°53'S, 116°10'E (WAM T68021); 1 male, Munster, 414 Hamilton Road, 32°08'S, 115°47'E (WAM T70033); 1 female, Murdoch, 32°04'S, 115°49'E (WAM T68073); 1 female, Mussel Pool, 7 km NW Midland, 31°50'S 115°56'E (WAM T77193); 1 male,

Myaree, 32°02'S, 115°48'E (WAM T70003); 1 female, N of Lake King-Norseman Rd, site LK13, 33°04'54"S, 119°59'53"E (T145307); 1 female, Nedlands, 31°59'S, 115°48'E (WAM 25/36); 2 females, same locality (WAM T65688); 1 female, same locality (WAM T67949); 1 female, same locality (WAM T67996); 1 male, same locality (WAM T70017); 1 male, same locality (WAM T70025); 1 female, same locality (WAM T70077); 1 female, same locality (WAM T87419); 1 male, Nedlands, Edward St, 31°59'S, 115°48'E (WAM T70053); 1 female, 1 juv., Neerabup, 62 Sublime Glade, 31°42'S, 115°47'E (WAM T700580); 1 female, Nollamara, 264 Wanneroo Road, 31°52'S, 115°50'E (WAM T68072); 1 female, North Perth, 31°56'S, 115°51'E (WAM 30/103); 1 female, North Tarin Rock Reserve, 10 mi N Tarin Rock Siding, 32°59'S, 118°13'E (WAM T68065); 1 female, Northam, 31°39'S, 116°40'E (AM KS3154); 1 female, Northampton, 28°21'S, 114°38'E (WAM 39/227); 1 female, Nyabing, 33°38'S, 118°08'0E (WAM T68024); 1 female, Oldfield River, 33°53'S, 120°47'E (WAM T87194); 1 female, Osborne Park, 31°54'S, 115°49'E (WAM 38/128); 1 female, Osborne Park, 480 Scarborough Beach Road (WAM T68081); 1 female, Pallinup River Estuary, E bank near river mouth, 34°29'S, 118°54'E (WAM T55985); 1 female, Palmyra, 32°02'S, 115°47'E (WAM T65691); 1 female, same locality (WAM T67953); 1 female, same locality (WAM T68064); 1 female, same locality (WAM T68071); 1 male, same locality (WAM T70012); 1 female, Parkerville, 31°52'S, 116°08'E (WAM T67940); 1 female, Parmelia, 32°14'S, 115°50'E (WAM T67975); 1 female, same locality (WAM T67981); 1 female, Perth, 31°57'S, 115°51'E (AM KS3312); 1 female, same locality (AM KS33347); 1 female, same locality (WAM T68058); 1 female, same locality (WAM T68067); 1 female, 2 juv., same locality (WAM 12/6486); 1 female, same locality (WAM 38/1296) 1 female, same locality (WAM T70048); 1 male, Perth, Criterion Hotel, 31°57'S, 115°51'E (WAM T70169); 1 male, Pingelly, 32°32'S, 117°05'E (WAM T87172); 1 female, Porongurup National Park, S end of Millinup Pass, 34°41'S, 117°54'E (WAM T70047); 1 female, Quaalup Homestead, 34°17'S, 119°29'E (WAM T70049); 1 male, Quindanning, NW of Worsley Alumina Conveyor #1, 32°59'17"S, 116°20'31"E (WAM T100341); 1 female, Quindanning, NW of Worsley Alumina Conveyor #1, 33°02'07"S, 116°13'56"E (WAM T100342); 1 male, Rivervale, 31°57'45"S, 115°54'55"E (WAM 78/11); 1 female, Rivervale, 177 Knutsford Ave, 31°57'50"S, 115°55'43"E (WAM T100125); 1 juv., same locality (WAM T81394); 1 male, Rossmoyne, 32°02'S, 115°45'E (WAM 78/5); 1 female, same locality (WAM T65696); 1 female, same locality (WAM T65697); 1 female, same locality (WAM T67951); 3 females, 2 juv., same locality (WAM T67982); 1 male, same locality (WAM T73691); 1 female, Rottnest Island, 32°S, 115°31'E (WAM T70054); 1 female, Salmon Gums, 12 mi SE (WAM T65687); 1 female, Sand Springs Homestead, N of Eradu/Sandsprings Roads junction, 28°49'S, 114°53'E (WAM T77195); 1 female, Shackleton, Box 62, 31°55'S, 117°50'E (WAM T65685); 1 male, Shannon National Park, Dog Pool, 34°46'S, 116°22'E (WAM T73554); 1 female, Shenton Park, 31°57'S, 115°48'E (WAM T68075); 1 female, Sorrento, 31°49'S, 115°44'E (MV K-9348); 1 female, South Perth, 31°59'S, 115°52'E (WAM 39/2648); 2 females, South Perth, 31°58'S, 115°51'E (WAM T65694); 1 female, same locality (WAM T65694); 1 female, same locality (WAM T68056); 1 female, Spalding Park North, 28°39'S, 114°38'E (WAM T70045); 1 male, Stirling Range Caravan Park, 34°19'00.0"S, 118°12'0E (WAM T73552); 1 female, Stirling Range National Park, Pillenorup Track, S of Wedge Hill, 34°25'S, 118°11'E (WAM T57872); 1 male, 1 female, Swanbourne, 31°58'S 115°46'E (WAM T70057); 1 female, same locality (WAM T70074); 1 female, Tammin at 'Ambleside', 31°38'S, 117°29'E (WAM T101111); 1 female, Tenterden, 34°24'S, 117°24'E (WAM 51/280); 1 female, Thornlie, 32°03'S, 115°57'E (WAM T68063); 1 female, Torndirrup National Park, Quaranup Road, 35°05'S, 117°55'E (WAM T70001); 1 female, Trayning, 31°06'S, 117°47'E (MCZ T67946); 1 male, Tuttaning Nature Reserve, West (WAM T74725); 2 females, Two Peoples Bay, 34°57'S, 118°11'E (WAM T65680); 1 female, Two Peoples Bay Reserve, 34°59'S, 118°11'E (WAM T70079); 1 female, Two Roads, Walpole-Nornalup National Park, 11.1 km 282 W Walpole, 34°57'S, 116°36'E (ZMDH 12373); 2 females, same locality (ZMDH 12375); 1 female, 1 juv., same locality (ZMDH 12377); 1 male, same locality (ZMDH); 1 female, Victoria Park, 31°58'S, 115°54'E (WAM 26/967); 1 female, same locality (WAM T67991); 1 male, Waggrakine, 28°44'S, 114°37'E (WAM T70030); 1 female, Walpole, 34°58'S, 116°46'E (WAM T70069); 1 female, Walpole-Nornalup National Park, Two Road, 11.1 km 282W Walpole, 34°57'56"S, 116°36'24"E (NHMD 12372); 1 female, same locality (NHMD 12374); 1 male, same locality (NHMD 12380); 1 male, Wanneroo, 31°45'S, 115°48'E (WAM 78/12); 1 male, same locality (WAM T70051); 1 male, Wembley, 31°56'S, 115°48'E (WAM T70038); 1 female, West Leederville, 12 Kimberley St, 31°56'S, 115°50'E (WAM T65686); 1 male, West Leeming Primary School, 32°04'S, 115°51'E (WAM T70056); 1 female, West Perth, 31°57'S, 115°50'E (WAM T67984); 1 male, West Perth, 1321 Hay St, 31°57'S, 115°50'E (WAM T70016); 1 male, Wilson, 32°01'S, 115°55'E (WAM 78/10); 1 female, Wittenoom, 22°14'S 118°20'E (WAM T65692); 1 female, Wubin, 30°06'S 116°37'E (WAM T65690); 1 male, Yanchep National Park, Mambiddy Cave, 31°33'S, 115°41'E (WAM T60291); 2 females, Yanchep Park, 31°32'S, 115°40'E (WAM T68068); 1 female, Yangebup, 32°07'S, 115°49'E (WAM T68088); 1 male, same locality (WAM T68100).

***Hortophora cucullus* sp. nov.**

Material examined: Australia: No exact location: 1 female, labelled "Camp 5", no exact locality (NMV

K-10371); **Northern Territory:** 1 female, Goyder Creek, 25°40'S, 134°25'E (WAM T75269); 1 female, Jabiru Residency, 12°41'S, 132°53'E (WAM T70164). **Queensland:** 1 female, Muckadilla, 26°31'S, 148°34'E (QM W37); 1 female, Rosella Plains, 100 Mile Swamp, Mount Rosey Resources Reserve, 18°25'S, 144°28'E (QM S116500). **South Australia:** 1 female, South Australia, NE corner (no exact locality) (SAM); 1 female, Carrieton, 32°26'S, 138°32'E (SAM); 1 male, 1 juv., Middleback Station, 32°57'S, 137°23'E (SAM); Pinkawillinie Conservation Park, 1 female, 33°07'S, 136°00'E (SAM). **Western Australia:** 1 female, Albion Downs, 2 km W of Blow W of, 27°17'S, 120°23'E (WAM T75268); 1 juv., Barrow Island, 20°46'47.4"S, 115°15'06.4"E (WAM); 1 juv., Barrow Island, 20°48'21.3"S, 115°27'09.0"E (HBI N15944-10); 1 juv., Barrow Island, 20°44'57.5"S, 115°27'48.0"E (HBI N15964-5); 1 juv., same locality (HBI N15965-3); 1 juv., Barrow Island, Gas Treatment Plant/QCC, 20°47'10.4"S, 115°27'36.2"E (HBI N16064-6); 1 juv., Barrow Island, 20°48'52.8"S, 115°26'29.9"E (HBI N16292-6); 1 juv., Barrow Island, 20°43'00.8"S 115°24'39.9"E (HBI N18098-23); 1 juv., same locality (HBI N18098-24); 5 juv., same locality (HBI N18098-25); 6 juv., Barrow Island, 20°51'58.0"S, 115°20'03.6"E (HBI N18107-22); 1 female, Barrow Island, 20°51'22.6"S, 115°23'20.5"E (HBI N18121-1); 1 female, same locality (HBI N18121-2); 1 juv., same locality (HBI N18121-3); 1 juv., same locality (HBI N18121-50); 1 juv., same locality (HBI N18121-51); 1 juv., same locality (HBI N18121-52); 1 juv., same locality (HBI N18121-53); 1 juv., Barrow Island, 20°49'57.5"S, 115°25'32.8"E (HBI N19738-5); 1 female, Big Lagoon, Peron National Park, Cape Peron, 32°16'S, 115°41'E (SAM NN12183); 1 female, Comet Vale Siding, 29°57'S, 121°07'0E (WAM T74714); 1 female, Hidden Valley, near Kununurra, 15°45'S, 128°44'E (AM KS67195); 1 female, Messengers Patch, 50 km SE of Yalgoo, 28°39'S, 116°57'E (WAM T74713); 1 female, same locality (WAM T74715); 1 male, Nanga Station, 26°28'S, 114°04'E (WAM T75270); 1 female, Woodstock Station, 21°36'S, 118°58'E (WAM T67928).

***Hortophora lodicula* comb .nov.**

Material examined: Australia: New South Wales: 1 female, Barren Grounds Reserve (AM KS34190); 1 female, Batehaven, Observation Head, Batemans Bay, 35°43'48.2"S, 150°11'56.0"E (SAM); 2 females, Brooklana, E of Dorrigo, 30°16'S, 152°51'E (AM KS34047); 1 female, Bungwahl, 32°24'S, 152°26'E (AM); 1 female, Bungwahl, Myall Lakes, 32°24'S, 152°26'E (AM KS3294); 1 female, Capertee, 33°09'S, 149°59'E (AM KS32681); 1 female, Green Cape, 37°16'S, 150°03'E (AM KS50790); 1 female, Huskisson, 35°03'S, 150°40'E (AM KS33013); 1 female, same locality (AM KS34145); 1 male, 1 female, Ku-Ring-Gai Chase National Park, 33°37'S, 151°17'E (AM KS58644); 2 females, Lane Cove River Park, Sydney, 33°46'S, 151°09'E (SAM); 1 female, Mt Ku-Ring-Gai, 33°39'S, 151°08'E (AM KS59028); 1 female, Mulgoa, 33°51'S, 150°39'E (AM KS53473); 1 female, Newnes State Forest, Deep Path Road (South), 33°21'S, 150°16'E (AM KS94608); 1 female, Prospect, 33°48'S, 150°54'E (AM KS32941); 1 male, Ryde, 33°49'S, 151°06'E (AM KS34157); 1 female, Sydney, 33°53'S, 151°13'E (NHM 1890.7.1.4193); 1 male, Tahmoor, 34°13'S, 150°35'E (AM KS34105). **Queensland:** 1 female, Blackdown Tableland, via Dingo, 23°50'S, 149°03'E (QM); 1 male, Cabbage Tree Creek, 25°27'S, 150°01'E (QM S116469); 1 male, 2 females, 30 juv., Camira, 27°38'S, 152°55'E (QM S25522); 1 male, Cooroy, 26°25'S, 152°55'E (QM W1568); 1 female, Eatons Hill, Brisbane, 27°20'S, 152°56'E (QM); 1 female, Kroombit Tops, 24°22'S, 151°01'E (QM); 1 female, Monday Creek, Severn River Camp, 28°57'S, 151°33'E (QM S13059); 1 male, Mt Asplenium, 28°08'59.9"S, 152°25'28.5"E (QM S60259); 1 female, Orchid Beach, Fraser Island, 24°58'S, 153°19'E (QM S31030). **Tasmania:** 1 male, 1 female, Kelso, 41°06'S, 146°47'E (AM KS29078); 1 female, Trevallyn, Launceston, 41°27'S, 147°10'E (AM KS28548). **Victoria:** 1 female, Boronia, 37°51'S, 145°17'E (MV 9816); 1 female, Croydon, 37°47'S, 145°16'E (MV K-9807); 1 female, Macedon, 37°25'S, 144°33'E (MV K-9808); 1 female, Maramingo, 8 km NE Genoa, 37°27'S, 149°37'E (MV K-10093); 1 female, Melbourne, Patents Office, 37°49'S, 144°58'E (MV K-9805); 1 male, 1 female, Mornington, 38°13'S, 145°02'E (MV K-9346); 4 females, Sandringham, Beaconsfield, 37°56'S, 145°E (MV K-9806).

***Hortophora megacantha* sp. nov.**

Material examined: Australia: New South Wales: 1 male, Beecroft Reserve, 33°45'S, 151°04'E (AM KS54416); 1 male, Berowra Valley Regional Park, Blue Gum Walk, 33°42'S, 151°06'E (AM KS70048); 1 male, Byles Creek, Cheltenham, 33°45'S, 151°05'E (AM KS53455); 1 female, same locality (AM KS53451); 1 male, Scheyville, 33°36'S, 150°53'E (AM KS53458); 1 male, Warrumbungle National Park, 0.8 km E of western entrance, 31°16'S, 148°57'E (AM KS75536). **Queensland:** 1 female, 'Trench', Moreton Island, 27°11'S, 153°24'E (QM S116499); 1 female, 1 juv., Blackdown Tableland, via Dingo, 23°50'S, 149°03'E (QM S116494); 1 female, Camira, 27°38'S, 152°55'E (QM S116492); 1 female, same locality (QM S15876); 1 male, 3 females, same locality (QM); 1 male, 1 female, Coolola, Teewah Creek, 26°05'S, 153°02'E (QM S116498); 2 females, Enterprise Mine, North Stradbroke Island, 27°35'S 153°27'E (QM S55638); 1 male, same locality (QM S55639); 1 female, same locality (QM S55640); 1 female, same locality (QM S56192); 1 male, same locality (QM S56213); 3 females, same locality (QM S56266); 2 males, 4 females, 1 juv., same locality (QM S56709); 2 males, Expedition Range National Park, Amphitheatre's Scrub, 25°13'S, 148°59'E (QM S44188); 1 female, Forty Mile Scrub, SW Mt Garnet, 18°05'S, 144°51'E (QM S116497); 1 male, Hurdle Gully, 13 km WSW Monto,

24°54'S, 150°59'E (QM S116495); 1 male, GBR islands, no exact locality (QM S84671); 1 female, 1 juv., Moreton Island, 27°11'S, 153°24'E (QM S116473); 1 female, Mt Coo-Tha, 27°29'S, 152°57'E (QM S116496); 1 female, Mount Hypipamee National Park, The Crater National Park, 17°25'S, 145°29'E (QM S47265).

***Hortophora porongurup* sp. nov.**

Australia: Western Australia: 2 females, 4 juv., Dog Pool, Shannon National Park, 34°46'S, 116°22'E (WAM T75417); 1 male, 1 juv., same locality (WAM T75420); 1 male, Gull Rock Road, off, 35°00'S, 118°02'E (WAM T88571); 1 female, 1 juv., Porongurup National Park, S end of Millinup Pass, 34°42'S, 117°54'E (WAM T155066); 2 females, Toolbrunup Track, Stirling Range National Park, 34°24'S, 118°04'E (WAM T75418); 1 male, Torndirrup National Park, gully outside N edge, on Limburners Road, 35°05'S, 117°54'E (WAM T75421); 1 female, Torndirrup, near Frenchmans Bay Road, 35°06'S, 117°54'E (WAM T75416); 1 male, William Bay National Park, near Elephant Rock carpark, 35°01'S, 117°14'E (WAM T81705).

***Hortophora tatianeae* sp. nov.**

Material examined: Australia: New South Wales: 1 male, Arcadia, 33°37'S, 151°03'E (AM KS53702); 2 females, Batehaven, Observation Head, Batemans Bay, 35°43'47.4"S 150°12'27.7"E (SAM); 1 female, Batemans Bay, 35°44'13.3"S 150°11'37.3"E (SAM); 1 female, Beecroft, 33°45'S, 151°04'E (AM KS45384); 1 female, same locality (AM S45385); 1 female, same locality (AM KS45386); 1 female, same locality (AM KS46028); 1 male, same locality (AM KS46035); 1 male, same locality (AM KS46093); 1 male, same locality (AM KS46094); 1 male, same locality (AM KS50168); 1 female, same locality (AM KS50227); 1 male, same locality (AM KS51873); 1 male, same locality (AM KS51877); 1 male, same locality (AM KS53704); 1 male, same locality (AM KS53705); 1 female, same locality (AM KS53706); 1 male, same locality (AM KS53707); 1 male, same locality (AM KS53708): 1 male, same locality (AM KS53710); 1 male, same locality (AM KS53711); 1 female, same locality (AM KS53863); 1 female, same locality (AM KS53864); 1 female, same locality (AM KS53865); 1 female, same locality (AM KS53866); 1 female, same locality (AM KS53868); 1 female, same locality (AM KS53869); 1 female, same locality (AM KS54419); 1 female, same locality (AM KS54421); 1 female, same locality (AM KS54432); 1 female, same locality (AM KS57101); 1 female, same locality (AM KS57102); 1 female, same locality (AM KS57111); 1 female, same locality (AM KS57113); 1 male, same locality (AM KS57114); 1 female, same locality (AM KS57115); 1 female, same locality (AM KS57116); 1 male, same locality (AM KS58345); 1 female, same locality (AM KS58347); 1 female, same locality (AM KS58348); 1 female, same locality (AM KS58634); 1 male, same locality (AM KS58646); 1 male, same locality (AM KS58662); 1 male, same locality (AM KS58663); 1 female, same locality (AM KS58664); 1 male, same locality (AM KS58665); 1 female, same locality (AM KS59018); 1 female, same locality (AM KS59019); 1 female, same locality (AM KS59020); 1 female, same locality (AM KS59021); 1 female, same locality (AM KS59022); 1 female, same locality (AM KS59023): 1 female, same locality (AM KS59024); 1 female, same locality (AM KS65714); 1 female, same locality (AM KS65826); 1 female, same locality (AM KS69375); 1 female, same locality (AM KS76862); 1 female, same locality (AM KS76866); 1 female, same locality (AM KS76881); 1 male, same locality (AM KS76882); 1 female, same locality (AM KS76883); 1 female, same locality (AMKS76889); 1 female, same locality (AM KS76897); 1 female, same locality (AM KS76898); 1 female, same locality (AM KS79616); 1 female, same locality (AM KS79714); 1 female, same locality (AM KS79738); 1 female, same locality (AM KS86836); Beecroft, Fearnley Park, 1 female, 33°45'S, 151°03'E (AM KS76849); 1 female, same locality (AM KS76904); 1 male, Blacktown, 33°46'S, 150°55'E (AM KS45904); 1 female, Bowral, 10 km SE, 34°32'S, 150°29'E (AM KS51912); 1 female, same locality (AM KS51915); 1 female, Broken Bay, The Basin, 33°36'S, 151°17'E (AM KS33536); 1 female, Brooklana, E Dorrigo, 30°16'S, 152°51'E (AM KS34095); 1 female, Bungwahl, Myall Lakes, 32°24'S, 152°26'E (AM KS51253); 5 females, same locality (AM KS51254); 1 female, Carrai State Forest, 31°04'S, 152°20'E (AM KS59039); 1 male, Carrai State Forest, 'Heydonville', 31°04'S, 152°20'E (AM KS45269); 1 female, Carrai State Forest, Hogsback Mountain Track, `Heydonville`, 30°59'S, 152°19'E (AM KS49102); 1 female, Carrow Brook, 32°17'S, 151°18'E (AM KS58624); 1 female, Cheltenham, 33°45'S, 151°05'E (AM KS53453); 1 male, Cremorne, 33°48'S, 151°15'E (AM KS79609); 1 female, Crommelin Research Station, Pearl Beach, 33°33'S, 151°18'E (AM KS50357); 1 female, Dorrigo National Park, 30°22'S, 152°45'E (AM KS48842); 1 female, East Dorrigo, Brooklana, 30°16'S, 152°51'E (AM KS33537); 1 male, Epping Station Strip, 32°46'S, 151°05'E (AM KS49919); 1 female, same locality (AM KS50204); 1 female, same locality (AM KS51838); 1 male, same locality (AM KS54456); 1 female, same locality (AM KS58668); 1 male, same locality (AM KS58688); 1 female, same locality (AM KS58702); 1 female, same locality (AM KS59015); 1 female, same locality (AM KS59016); 1 female, Frazer Reserve, Wahronga, 33°43'S, 151°08'E (AM KS54460); 1 female, Gerroa, Seven Mile Beach, 34°46'20.9"S, 150°48'47.4"E (SAM); 1 female, Goldsborough Valley, side track to quarry, 17°12'S, 145°44'E (AM KS57826); 1 female, Gordon, 33°45'S, 151°10'E (AM KS8713); 1 female, same locality (AM KS8835); 1 male, same locality (AM KS9539); 5 females, same locality (AM KS9540); 1 female, Gosford, 33°26'S,

151°21'E (AM KS33532); 1 female, Greenwich, 33°50'S, 151°11'E (AM KS51595); 1 female, same locality (AM KS56769); 1 male, Hornsby, 33°42'S, 151°06'E (AM KS53337); 2 males, same locality (AM KS91351); 1 female, Hornsby, Canla Creek Gully, 33°40'S, 151°06'E (AM KS51599); 1 male, Hornsby, Waitara Creek, 33°42'S, 151°05'E (AM KS87286); 1 male, Jamberoo, 34°39'S, 150°46'E (AM KS72894); 1 female, same locality (AM KS72896); 1 female, same locality (AM KS72897); 1 female, Jamberoo Mountain, 34°40'S, 150°43'E (AM KS46036); 1 male, same locality (AM KS46083); 1 male, same locality (AM KS46085); 1 male, same locality (AM KS46086); 1 female, same locality (AM KS46087); 1 female, same locality (AM KS46091); 1 female, same locality (AM KS50214); 1 female, same locality (AM KS51033); 1 male, same locality (AM KS53712); 1 male, same locality (AM KS53714): 1 male, same locality (AM KS53716): 1 female, same locality (AM KS53717); 1 male, same locality (AM KS56915); 1 female, same locality (AM KS57122); 1 female, same locality (AM KS58639); 1 female, same locality (AM KS58698); 1 female, same locality (AM KS59025); 1 female, same locality (AM KS59033); 1 female, same locality (AMKS65833); 1 female, same locality (AM KS76946); 1 female, same locality (AM KS76947); 1 male, same locality (AM KS76948); 1 female, Ku-Ring-Gai Chase National Park, 33°39'S, 151°08'E (AM KS58666); 1 female, same locality (AM KS59027); 1 female, same locality (AM KS59029); 1 female, same locality (AM KS66008): 1 female, same locality (AM KS66012); 1 female, Ku-Ring-Gai Chase National Park, McCarrs Creek, 33°39'S, 151°15'E (NHMD 12324); 1 female, Lane Cove River Park, Sydney, 33°46'S, 151°09E (SAM); 1 female, Lane Cove, Sydney, 33°49'S, 151°10'E (AM KS54471); 1 female, same locality (SAM); 1 female, 1 juv., Minnamurra Falls, 34°38'S, 150°44'E(AM KS33340); 1 female, Mittagong, 34°27'S, 150°27'E (AM KS34131); 1 male, Mooney Mooney Creek, 33°31'S, 151°12'E (AM KS34008); 1 male, same locality (AM KS34010); Mt Colah, 33°40'S, 151°07'E 1 male, same locality (AM KS59030); 1 male, same locality (AM KS59031); 1 male, same locality (AM KS59032); 1 female, same locality (AM KS59036); 1 female, 1 juv., Narrabeen Lakes, 33°43'S, 151°17'E (AM); 1 male, 1 female, Newnes State Forest, Birds Rock Flora Reserve, 0.6 km from Sunnyside Ridge Road, 33°19'S, 150°11'E (AM KS94504); 4 females, Newnes State Forest, Deep Pass Road (South), 33°21'S, 150°16'E (AM KS94610); 3 females, Newnes State Forest, Waratah Ridge Road, 1.4 km from Glowworm Tunnel Road, 33°23'S, 150°14'E (AM KS94536); 1 female, Newnes State Forest, Waratah Ridge Road, 3.2 km from Glowworm Tunnel Road, 33°23'S, 150°15'E (AM KS94662); 1 female, North Ryde, 33°48'S, 151°07'E (AM KS33533); 1 female, Orara East State Forest, Coffs Harbour, 30°18'S, 153°07'E (SAM): 1 female, 1 juv., Oxford Falls, 33°44'S, 151°14'E (AM KS33336); 1 male, Pennant Hills, 33°44'S, 151°04'E (AM KS66011); 1 female, same locality (AM KS66013); 1 female, same locality (AM KS66016): 1 male, same locality (AM KS66019); 1 female, same locality (AM KS66022); 1 female, Pymble, 33°45'S, 151°09'E (AM KS53440); 1 female, 1 juv., Richmond Range, 28°59'S, 152°45'E (QM S116507); 1 female, same locality (QM); 1 female, Royal National Park, 34°08'S, 151°04'E (AM KS18819); 1 female, same locality (AM KS33306); 1 female, same locality (AM KS33307); 1 female, same locality (AM KS33312): 1 female, same locality (AM KS34049); 1 female, same locality (AM KS34160); 1 female, same locality (AM KS68764); 1 female, Scheyville, 33°36'S, 150°53'E (AM KS53447); 1 female, The Basin, 33°36'S, 151°17'E (AM KS32841); 1 male, same locality (AM KS34181); 1 female, Thornleigh, 33°44'S, 151°04'E (AM KS56986); 1 male, Turramurra, 33°44'S, 151°08'E (AM KS34023); 1 male, 1 female, Waitara Creek, Hornsby, 33°42'S, 151°05'E (NHMD); 1 male, Warrah, near Crommelin Research Station, 33°28'S, 151°21'E (AM KS50365). **Queensland:** 1 male, Atherton Plateau, Rose Gums Wilderness Retreat, 12.4 km 059ENE Malanda, 17°18'S, 145°42'E (NHMD 12323); 2 females, Atherton Tablelands, Rose Gums, 17°18'S, 145°42'E (NHMD 12321); 1 female, same locality (NHMD 12327); 1 female, Ballinjui Falls Track, Lamington National Park, 28°12'59.1"S, 153°10'41.3"E (QM S116504); 8 females, Binna Burra, Lamington National Park, 28°12'S, 153°11'E (QM S116508); 1 male, same locality (QM S116470); 1 female, same locality (QM S116471); 2 males, 1 female, 1 juv., same locality (QM S116472); Bluewater Range, 19°12'S, 146°24'E 1 male, same locality (QM S33996); 1 female, 1 juv., Boonjee, 17°24'S, 145°44'E (QM S116503); 1 female, Broken River, Eungella National Park, 21°10'S, 148°30'E (WAM T77188); 1 female, Brookfield, 27°29'S, 152°54'E (QM S111916); 1 female, Buhot Creek, Burbank, 27°35'S, 153°10'E (QM); 1 female, same locality (QM); 2 males, 1 female, 8 juv., Bulburin State Forest, 24°30'S, 151°35'E (QM S116501); 2 males, same locality (QM S111914); 6 females, Bulburin, Forestry Nursery, 24°31'S, 151°29'E (AM KS0071); 1 female, Bulimba Creek, Carindale, 27°30'S, 153°06'E (QM); 1 female, same locality (QM); 1 male, Bunya Mountains National Park, behind Rice's Cabins, 26°53'S, 151°35'E (QM S42804); 1 female, Burleigh Heads, 28°06'S, 153°26'E (QM); 3 females, Camira, 27°38'S, 152°55'E (QM); 1 female, 7 juv., same locality (QM); 1 male, Carbine Tableland, Devils Thumb, 16°23'S, 145°17'E (QM S29986); 1 male, Chujeba Peak summit, 7 km SW Redlynch, 16°56'S, 145°39'E (QM S41584); 1 male, Conondale Range, 26°45'S, 152°37'E (QM); 1 male, 2 females, Crediton, 21°13'S, 148°35'E (QM S116506); 1 female, 3 juv., Curra, via Gympie, 26°04'S, 152°35'E (QM S25626): 3 females, Dalrymple Heights, near Eungella, 21°04'S, 148°35'E (AM KS0285); 2 females, Dandabah, Bunya Mountains National Park, 26°53'S, 151°37'E (QM S116510); 1 male, Davies Creek Road, 20 km ESE Mareeba, 17°12'S, 145°40'E (QM S31587); 1 female, East Normanby River, 15°53'S, 145°12'E (QM S18915); 1 female, Eungella, school-

house, 21°08'S, 148°29'E (QM); 2 females, 1 juv., same locality (QM); 1 male, 1 female, same locality (QM S13042); 1 female, Eungella National Park, Broken River rainforest walk, 0.5 km from carpark, 21°10'S, 148°30'E (AM KS58672); 1 female, 1 juv., Eurimbula, 24°11'S, 151°50'E (AM KS12778); 1 female, Girraween National Park, 28°50'S, 151°55'E (QM S111915); 1 female, 10 juv., Kroombit Tops, 24°22'S, 151°01'E (QM); 2 males, 5 females, 5 juv., same locality (QM); 1 female, 3 juv., Kroombit Tops, Barracks, 24°22'S, 151°03'E (QM); 2 females, Kroombit Tops, Three Moon Creek, 24°22'S, 151°01'E (QM); 1 female, 10 juv., Kroombit Tops, Upper T47 Creek, 24°25'S, 151°05'E (QM); 2 females, Lamington National Park, 28°12'S, 153°10'E (NHMD 12325); 1 female, 1 juv., same locality (QM S116502); 1 female, Lamington National Park, near O`Reilly`s Guesthouse, 28°14'S, 153°08'E (NHMD 12320); 2 females, same locality (NHMD 12329); 1 female, same locality (NHMD 12326); 1 female, Lamington National Park, O`Reilly Trail, 28°13'54.2"S, 153°08'14.4"E (NHMD 12322); 1 male, Mt Coo-Tha, 27°29'S 152°57'E (QM); 1 female, Mt Elliot, North Creek, 9°29'S, 146°57'E (QM S17878); 2 females, same locality (QM S17941); 1 male, Mt Father Clancy, 9 km S Milaa Milaa, 17°35'S, 145°38'E (QM S23052); 1 male, Mt Finnigan summit, via Helenvale, 15°49'S, 145°17'E (QM S24609); 1 male, Mt Glorious, 27°20'S, 152°46'E (QM S22446); 1 female, same locality (SAM); 1 female, 3 juv., Mt Sampson, 15°48'S, 145°12'E (QM S41105); 1 female, Mt Spurgeon, 2 km SE, 16°26'S, 145°12'E (QM S16534); 1 male, 4 females, Mt Superbus, 28°14'S, 152°29'E (QM S15882); 1 female, Mt Tamborine National Park, Wiches Falls, 27°56'S, 153°10'E (NHMD 12330); 2 females, Mt William, Dalrymple Heights, 21°01'S, 148°36'E (AM KS0360); 1 female, Mudlo Gap, 26°01'22.4"S 152°12'46.7"E (QM); 1 female, Nagarigoon, Lamington National Park, 28°12'S, 153°10'E (QM S116511); 1 female, O`Reillys, Lamington, 28°14'S, 153°08'E (QM); 4 females, Ravensbourne National Park, 27°22'S, 152°11'E (QM): 1 female, Roaring Meg valley, 16°04'S, 145°25'E (QM S58188); 2 females, same locality (QM S58280); 1 female, Tamborine National Park, Witches Falls, 27°27'S, 153°10'E (NHMD 12328); 1 female, 3 juv., Thornton Peak, N of Daintree, 16°10'S, 145°22'E (AM KS0496); 1 female, 6 juv., Topaz, Hughes Road, 17°25'57.2"S 145°42'29.3"E (QM S58194); 3 females, Upper Brookfield, 27°29'S, 152°54'E (QM); 1 female, 1 juv., Upper Isley Creek, 17°03'S, 145°41'E (QM); 1 female, 1 juv., Upper Plath Road, 17°23'S, 145°26'E (QM S46911); 1 female, 3 juv., Windsor Tableland, 1.2 km past barracks, 16°15'S, 145°02'E (QM); 1 female, 3 juv., Windsor Tableland, 28 km NNW Mt Carbine, 16°12'S, 145°05'E (QM S116509); 1 male, Wishing Tree Circuit, O`Reillys, Lamington National Park, 28°15'S, 153°09'E (QM S16526). **South Australia:** 2 females, Ewens Ponds, 38°01'25.8"S 140°47'26.9"E (SAM). **Tasmania:** 1 female, George Town, 41°06'S, 146°49'E (SAM). **Victoria:** 1 male, no exact location (NMV K-9435); 1 female, no exact location (NMV K-9818). 1 female, Croydon, 37°47'S, 145°16'E (NMV K-9817); 1 female, same locality (NMV K-9820); 1 female, Dermodys Camp, Avon River State Forest, 37°48'S, 146°55'E (WAM T68052); 2 females, Eltham, 37°43'S, 145°08'E (NMV K-10092); 1 male, same locality (WAM T68012); 1 female, Monash University, Clayton, 37°55'S, 145°07'E (WAM T77192); 1 male, Morwell National Park, 38°22'S, 146°24'E (SAM); 2 males, 4 females, Ringwood East, Hender St and neighbourhood, 37°49'S, 145°15'E (WAM T68054); 2 females, same locality (WAM T68055); 1 female, Stoney Creek, South Gippsland, 38°36'S, 146°01'E (NMV K-10091); 1 female, Tennyson Creek, 5 km NW of Buldah, 37°14'S, 149°07'E (NMV K-9819).

***Hortophora transmarina* comb. nov.**

Material examined: Australia: New South Wales: 1 female, 3 juv., no exact location (ZMB 22413); 1 female, Albion Park, 34°34'S, 150°46'E (AM KS45506); 1 female, Alexandria, 33°54'S, 151°12'E (AM KS34362); 1 male, Altonville, 28°50'S, 153°26'E (QM S51972); 1 female, Angourie, near Yamba, 29°29'S, 153°22'E (AM KS45909); 1 male, Annandale, 33°53'S, 151°10'E (AM KS4439); 1 male, Ashfield, 33°53'S, 151°07'E (AM KS34915); 1 female, Bald Hill, near Macksville, 30°20'S, 152°27'E (AM KS13819); 1 female, Banksia, 33°57'S, 151°08'E (AM KS3283); 1 male, Bankstown, 33°56'S, 151°01'E (AM KS33530); 1 female, Banora Point, 28°13'S, 153°32'E (QM S35721); 1 male, Beecroft, 33°45'S, 151°04'E (AM KS22681); 2 females, same locality (AM KS22694); Beecroft Reserve, 33°45'S, 151°04'E, 1 female (AM KS63218); Bellevue Hill, 33°53'S, 151°15'E, 1 male, 1 female (AM KS3272); 1 female, same locality (AM KS3280); 1 female, same locality (AM KS33504); 1 female, Beverly Hills, 33°56'S, 151°05'E (AM KS3258); 1 female, Blairmount, 34°02'S, 150°47'E (AM KS86663); 1 female, Blue Mountains, 33°40'S, 150°28'E (NHM); 1 female, Bondi, 33°53'S, 151°16'E (AM KS3269); 1 male, Bondi Beach, 33°53'S, 151°17'E (AM KS33393); 1 male, Bonny Hills, 31°36'S, 152°51'E (AM KS10161); 1 male, Bonny Hills, 8 km N, 31°35'S, 152°51'E (AM KS10173); 1 female, same locality (AM KS10174); 1 female, same locality (AM KS10175); 1 female, Booti Booti National Park, 32°16'S, 152°31'E (AM KS65304); 1 female, Botany, 33°57'S, 151°12'E (AM KS3246); 1 female, same locality (AM KS3256); 1 female, same locality (AM KS3257); 1 male, same locality (AM KS3276); 1 female, Bowraville, 30°39'S, 152°51'E (AM KS7295); 1 female, Bungwahl, Myall Lakes, 32°24'S, 152°26'E (AM KS49776); 1 female, same locality (AM KS49777); 1 female, Cherrybrook, 33°42'S, 151°18'E (AM KS50230); 1 male, Clarence River, Copmanhurst, 29°35'S, 152°46'E (SAM); 1 female, 1 male, Clareville Beach, 33°38'S, 151°19'E (AM KS69297); 1 male, Collaroy, 33°44'S, 151°18'E (AM KS42592); 1 male, Collaroy Plateau, 33°44'S, 151°17'E (AM KS22464); 1 female, Concord, 33°51'S,

151°06'E (AM KS33505); 1 female, Coodgee Bay, 33°55'11.2"S, 151°14'50.9"E (SAM); 1 male, Coorabell, near Murwillumbah, 28°37'S, 153°28'E (AM KS18438); 1 male, Coraki, 29°00'S, 153°17'E (AM KS16333); 1 female, Crommelin Research Station, Pearl Beach, 33°33'S, 151°18'E (AM KS50360); 2 males, 4 females, 1 juv., Crowdy Bay National Park, 9 km S of Laurieton, 31°50'S, 152°45'E (AM KS9392); 1 male, Cundletown, 31°54'S, 152°33'E (AM KS56535); 1 female, same locality (AM KS58674); 1 female, Dee Why, 33°45'S, 151°17'E (AM KS69299); 1 female, Dorrigo Nature Park, `The Glade`, 30°22'S, 152°45'E (AM KS30246); 1 female, Dover Heights, 33°52'S, 151°17'E (AM KS34390); 1 female, Dubbo, 32°15'S, 148°37'E (AM KS7863); 1 female, Earlwood, 33°55'S, 151°08'E (AM KS3254); 1 male, Emu Heights, 33°45'S, 150°41'E (AM KS34376); 1 female, Epping Station, 33°46'S, 151°05'E (AM KS58673); 1 female, same locality (AM KS59038); 1 female, Epping Strip, 33°48'S, 151°09'E (AM KS58620); 1 female, same locality (AM KS58667); 1 female, same locality (AM KS58669); 1 female, Fairfield, 33°52'S, 150°57'E (AM KS45907); 1 female, Frenchs Forest, 33°45'S, 151°13'E (AM KS16724); 1 female, Gerringong, 34°44'S, 150°50'E (AM KS30249); 1 male, Gladesville, 33°50'S, 151°07'E (AM KS33087); 1 male, 1 female, Glebe, 33°52'S, 151°11'E (AM KS3261); 1 female, same locality (AM KS3267); 1 male, 1 female, Gosford, 33°26'S, 151°21'E (AM KS3278); 1 female, same locality (AM KS33789); 1 female, Gosford district, 33°25'S, 151°20'E (MV K-2627); 1 male, Gymea, 34°02'S, 151°04'E (AM KS6234); 1 female, Hannon Vale, near Taree, 31°43'S, 152°36'E (AM KS13554); 1 female, Hornsby, 33°42'S, 151°06'E (AM KS3250); 1 female, same locality (AM KS3273); 1 female, Hungry Point, Cronulla, 34°03'S, 151°09'E (NHMD 12378); 1 female, Hunter River, 32°54'15.1"S, 151°45'45.4"E (NHM 1893.7.45.1.20); 1 female, Hunters Hill, 33°50'S, 151°08'E (AM KS32848); 1 male, Illawong, 36°01'S, 148°39'E (AM KS58671); 1 male, Iluka, 29°24'S, 153°21'E (AM KS4527); 1 female, Jervis Bay, 35°03'S, 150°44'E (AM KS68014); 1 female, Kensington, 33°55'S, 151°13'E (AM KS3282); 1 female, same locality (AM KS8712); 1 male, Kiama, 34°40'S, 150°51'E (AM KS58676); 1 female, Kingston, Norfolk Island, 29°03'S, 167°57'E (AM KS54335); 1 female, same locality (AM KS54336); 1 female, same locality (AM KS54337); 1 female, same locality (AM KS54338); 1 female, same locality (AM KS54339); 1 female, same locality (AM KS54340); 1 female, same locality (AM KS54341); 1 male, Ku-Ring-Gai Chase National Park, McCarrs Creek, 33°39'S, 151°15'E (NHMD 12379); 2 females, Ku-Ring-Gai Chase National Park, Smiths Creek, 33°39'S, 151°13'E (NHMD 12365); 1 male, La Perouse, 33°59'S, 151°14'E (AM KS3275); 1 female, Lidcombe, 33°52'S, 151°03'E (AM KS4635); 2 females, Long Bay, 33°58'S, 151°15'E (AM KS3268); 1 female, Macksville, 30°43'S, 152°55'E (AM KS18353); 1 female, Main Arm, near Mullumbimby, 28°31'S, 153°26'E (AM KS4712); 1 female, Malabar, 33°58'S, 151°15'E (AM KS33506); 1 female, Manly, 33°48'S, 151°17'E (AM KS33523); 1 female, Maroubra, 33°57'S, 151°15'E (AM KS3271); 1 female, Matraville, near Sydney, 33°58'S, 151°14'E (AM KS3255); 2 female, Miller, 33°55'S, 150°52'E (AM KS3244); 1 female, Mortdale, 33°58'S, 151°05'E (AM KS1281); 1 female, Mosman, 33°50'S, 151°15'E (AM KS3262); 1 female, same locality (KS32851); 1 female, same locality (AM KS33507); 1 male, same locality (AM KS4521); 1 male, same locality (AM KS7243); 1 female, Mt Colah, 33°40'S, 151°07'E (AM KS59034); 1 female, same locality (AM KS59035); Mt 1 female, Ku-Ring-Gai, 33°39'S, 151°08'E (AM KS65073); 1 female, Narara, 33°23'S, 151°21'E (MV K-2631); 1 female, Narrabeen, 33°43'S, 151°17'E (AM KS33727); 1 female, Narrabeen Lakes (AM KS33297); 1 male, same locality (AM KS33300); 1 female, Neutral Bay, 33°50'S, 151°13'E (AM KS3259); 1 female, Norfolk Island, 29°05'S, 168°00'E (AM KS51592); 1 female, North Sydney, 33°49'S, 151°12'E (AM KS3279); 1 female, Northwood, Lane Cove, 33°50'S, 151°11'E (AM KS3253); 1 female, Oak Flats, near Albion Park, 34°34'S, 150°49'E (AM KS33332); 1 female, Paddington, 33°53'S, 151°13'E (AM KS3281); 1 female, Paddington, Sydney (AM KS21381); 1 male, Panania, 33°57'S, 150°59'E (AM KS3252); 1 female, Parramatta, 33°48'S, 151°01'E (AM KS30661); 1 female, Randwick, 33°55'S, 151°15'E (AM KS3245); 2 females, same locality (AM KS33320); 1 male, Redfern, 33°54'S, 151°12'E (AM KS33322); 1 female, Redhead, 32°04'S, 152°33'E (AM KS33345); 1 female, Revesby, 33°57'S, 151°01'E (AM KS33301); 1 female, 2 juv., Richmond River, 28°55'S, 152°58'E (MV K-2617-9); 1 female, Rockdale, Sydney, 33°57'S, 151°08'E (AM KS33324); 1 female, Rosebay, 33°52'S, 151°16'E (AM KS4956); 1 female, Roseville, 33°47'S, 151°12'E (AM KS33352); 1 male, Royal National Park, 34°08'S, 151°04'E (AM KS33304); 1 male, same locality (AM KS33723); 1 female, Singleton, 32°34'S, 151°10'E (AM KS3277); 1 female, South Sydney, 33°54'S, 151°11'E (AM KS3266); 2 females, 3 juv., South West Rocks, Trial Bay, 30°53'S, 153°02'E (AM KS3251); 1 male, St Gorges Basin, 35°05'S, 150°35'E (AM KS22670); 1 female, same locality (AM KS22678); 4 females, same locality (AM KS23509); 1 female, Steeles Point, Norfolk Island, 29°02'S, 167°59'E (AM KS43958); 1 female, same locality (AM KS43959); 1 female, Surrey Hills, 33°53'S, 151°13'E (AM KS3265); 1 male, 2 females, Sydney, 33°53'S, 151°13'E (NHM 1915.3.5.992-994); 2 males, 8 females, 7 juv., same locality (NHM 227–237); 1 male, 2 females, same locality (NHM 4235–6); 1 female, Sydney, 33°52'S, 151°13'E (AM KS32667); 1 female, same locality (AM KS32949); 1 female, same locality (AM KS33321); 1 male, Sylvania, 34°01'S, 151°06'E (AM KS22426); 1 male, Taree, 31°54'S, 152°29'E (AM KS42361); 2 female, Taylors Beach, near Port Stephens, 32°42'S, 152°06'E (AM KS1345); 1 male, Terranora, 28°14'S, 153°30'E (QM); 1 male, Thornleigh, 33°44'S, 151°04'E (AM KS56987); 1 male, Towoon Bay, 33°22'S, 151°29'E (AM KS34702); 1 male, Turramurra,

33°44'S, 151°08'E (AM KS44283); 2 females, Tweed Heads, 28°10'S, 153°33'E (QM S20348); 1 female, Wardell, 28°57'S, 153°28'E (AM KS1778); 1 male, Warriewood Beach, 33°42'S, 151°19'E (AM KS33563); 1 male, Watsons Bay, 33°51'S, 151°17'E (AM KS3260); 1 male, Woollahra, 33°53'S, 151°15'E (AM KS34323); 1 male, Woolwich, 33°50'S, 151°10'E (AM KS33401); 1 male, Woy Woy, 33°29'S, 151°20'E (AM KS22415); 1 female, Yagoona, 33°54'S, 151°01'E (AM KS33510); 1 female, Yengo National Park, near Finchley Trig, 32°59'S, 150°51'E (AM KS51374). **Northern Territory:** 1 female, Adelaide River, 13°14'S, 131°08'E (WAM T73550); 1 female, Cooinda, 12°54'S, 132°31'E (WAM T67958); 1 female, Darwin, 12°27'S, 130°50'E (MV K-2635); 1 male, same locality (MV K-2640); 1 female, same locality (AM KS4144); 1 female, same locality (AM KS44994); 1 female, East Point, Darwin, 12°27'S, 130°52'E (QM); 1 female, Fogg Dam, nearby, 12°35'S, 131°20'E (QM S69321); 1 female, Groote Eylandt, 13°56'S, 136°36'E (NHM 1926.I.25.51); 1 female, same locality (NHM 1926.I.25.52); 1 female, Groote Eylandt, C.M.S. Mission, 13°59'S, 136°28'E (AM KS33328); 1 female, Jim Jim Falls, 13°17'S, 132°50'E (WAM T67959); 1 female, Kakadu National Park, 13°06'S, 132°24'E (SAM); 1 female, Manngarre Rainforest, 12°25'S, 132°58'E (WAM T67956); 1 female, 1 juv., Melville Island, 11°33'S, 130°56'E (MV K-2638–9); 1 female, Snake Bay, Melville Island, 11°25'S, 130°54'E (SAM); 1 female, Snake Creek, 7 mi N of Adelaide River, 13°03'S 131°10'E (WAM T67990); 1 female, Yapilika, Melville Island, 11°31'S 131°02'E (SAM). **Queensland:** 3 females, 'Trench', Moreton Island, 27°11'S 153°24'E (QM S55390); 1 male, Acacia Ridge, Brisbane, 27°35'S 153°01'E (WAM T67957); 1 female, Albion, Brisbane, 27°28'S 153°03'E (QM); 1 female, Alderley Height, Brisbane, 27°28'S 153°03'E (QM); 1 female, Algester, 27°37'S 153°02'E (QM S73806); 1 female, Amber Station, 17°47'S 144°22'E (QM); 1 male, Annerley, 27°28'S 153°03'E (QM); 1 female, Ashgrove, 27°27'S 153°03'E (QM S35205); 1 male, Aspley, Brisbane, 27°22'S 153°01'E (QM S42833); 1 female, same locality (QM); 1 female, Atherton, 807 m, 17°16'S, 145°28'E (T151653); 2 females, Atherton Tablelands, Lake Tinaroo, N shore, 17°09'S 145°33'E (NHMD 12364); 1 female, Atherton Tablelands, Rose Gums, 17°18'S 145°42'E (NHMD 12366); 1 female, Atherton, 3 km E on Yungabucca Road, 17°16'S, 145°31'E (AM KS42448); 1 female, Auchenflower, 27°28'S 152°59'E (QM); 1 female, Ayr, 19°34'S 147°27'E (QM W1675); 1 female, Babinda, 17°20'S 145°55'E (QM); 2 females, Badu Island, Torres Strait, 10°07'S 142°09'E (QM); 1 female, Bald Hills, Brisbane, 27°28'S 153°01'E (QM S359); 1 female, Bald Hills, Lobe Street, 27°28'S 153°01'E (QM 21183); 2 females, same locality (QM S21184); 5 females, Baldwins Swamp, Bundaberg, 24°52'S 152°21'E (QM S20970); 1 male, Bamaga and Lockerbie East, 10°53'S 142°23'E (QM); 1 male, Beaudesert, 28°00'S 153°00'E (QM S21644); 1 female, Beerburrum, 26°58'S 152°58'E (QM S32203); 1 female, Bells Creek, Caloundra, 26°48'S 153°08'E (QM); 1 female, Bill Tompkins Line Hill, Iron Range, 12°46'S 143°19'E (QM); 1 female, Biloela, 24°24'S 150°30'E (QM); 1 female, Birthday Mountain, McIlwrath Range, Cape York, 13°33'S 143°08'E (AM KS5347); 1 female, Black Fellow Creek, East Branch, 27°45'S 152°13'E (QM); 1 male, Blackbutt, 26°52'S 152°11'E (QM S35191); 1 female, Blackbutt, Cherry Creek Road, 26°52'S 152°11'E (QM S21038); 1 male, 1 female, 1 juv., Blackdown Tableland, via Dingo, 23°50'S 149°03'E (QM); 1 male, Boondall, 27°20'S 153°04'E (QM); 2 females, Bowen, 20°00'S 148°14'E (ZMH); 1 female, Brandy Creek, 20°21'S 148°43'E (QM); 1 female, Bribie Island, 26°57'S 153°07'E (QM S20392); 1 male, Brisbane, 27°28'S 153°01'E (QM S3489); 1 male, same locality (QM S360); 1 male, same locality (QM W560); 1 female, same locality (QM); 3 females, same locality (QM); 1 female, same locality (QM); 1 male, same locality (QM); 1 male, same locality (QM); 1 male, same locality (QM); 1 female, same locality (QM); 1 female, same locality (QM); 2 females,same locality (QM); 1 male, same locality (QM); 3 females, same locality (QM); 1 female, same locality (QM); 1 female, same locality (QM); 1 female, 5 juv., same locality (SAM); 4 females, Brisbane area, 27°28'S 153°01'E (QM); Brookfield, Savages Road, 27°29'S 152°54'E, 2 females, 14 juv. (QM S24094); 1 female, Browns Plains, 27°28'S 153°01'E (QM S30567); 1 female, Buddina State School, 26°42'S 153°08'E (QM S4173); 1 female, Buhot Creek Reserve, Burbank, 27°35'S 153°10'E (WAM T84363); 1 female, same locality (WAM T84364); 2 female, Burleigh, 28°05'S 153°27'E (QM W1669); 1 female, same locality (QM); 1 female, Caboolture, 27°05'S 152°51'E (QM); Cairns, 16°55'S 145°46'E, 1 female (NHM 1968.2.26.8); 1 male, same locality (MV K-2623); 1 female, same locality (AM KS3288); 1 female, same locality (AM KS33305); 1 male, same locality (AM KS33353); 1 female, Caloundra, 26°48'S 153°08'E (QM S21981); 1 female, Camp Hill, Brisbane, 27°28'S 153°03'E (QM); 1 male, Carina Heights, Brisbane, 27°30'S 153°05'E (QM); 1 male, Carseldine, Brisbane, 27°28'S 153°03'E (QM S42850); 1 female, Chelmer, 27°28'S 153°03'E (QM); 1 female, same locality (QM); 1 female, 1 juv., Chelsea Road Bushlands Reserve, 27°28'S 153°11'E (QM S65306); 1 female, Chermside, 27°28'S 153°01'E (QM); 1 female, same locality (QM); 1 female, Clayfield, Brisbane, 27°28'S 153°03'E (QM W630); 1 male, same locality (QM); 1 female, same locality (QM); 1 female, same locality (QM); 1 female, Cleveland, 27°32'S, 153°16'E (QM S41796); 1 male, Cleveland Hospital, 27°28'S, 153°03'E (QM); 1 female, Clontarf, 27°58'S 151°15'E (QM S26088); 2 males, 1 juv., Closeburn, 27°20'S 152°52'E (QM); 1 female, same locality (QM); 1 female, Cockatoo Creek, telegraph line to (Heathlands), 27°08'12.9"S, 151°38'31.8"E (QM S33670); 1 female, Coen, 39 mi S, 14°26'S 143°20'E (QM); 1 male, Coffs Harbour, 30°31'S 153°08'E (QM S25916); 2 females, 7

juv., Considine Bay, Great Keppel Island, 23°04'S 150°53'E (QM); 2 males, 1 female, Cooktown, 15°22'S 145°00'E (MV K-2624–6); 2 females, Cooktown, Le Souef, 15°41'S 145°07'E (MV K-2611–2); 1 female, 1 juv., same locality (MV K-2613-4); 1 female, same locality (MV K-2615); 1 female, Coolum, 26°32'S 153°05'E (MV K-2620); 2 females, same locality (MV K-2629-30); 1 male, same locality (MV K-2632); 1 female, same locality (MV K-2678); 1 female, Crestmead, 27°41'S 153°05'E (QM S35204); 1 female, Dalby, 27°11'S 151°15'E (QM S60648); 1 female, Daua Island (Dowar Islet), Torres Strait, 9°56'37.7"S, 144°01'18.9"E (QM); 1 male, Dicky Beach, Caloundra, 26°48'S 153°08'E (QM); 1 female, Eagle Junction, Brisbane, 27°28'S 153°01'E (QM); 1 female, Emerald, 23°31'S 148°01'E (QM S39667); 1 female, same locality (QM S42820); 1 female, 3 juv., Emu Park, Rockhampton, 23°16'S 150°05'E (QM); 1 female, Enoggera Creek, near Kelvin Grave Road Bridge, 27°26'S 152°57'E (QM S18919); 1 female, Erskine Island, Great Barrier Reef, 23°30'S 151°46'E (AM KS3292); 1 female, Eungella area, road to Eungella Dam, at junction Freegards Road, 21°12'S 148°28'E (AM KS54219); 1 female, Everton Hills, 27°23'S 152°56'E (QM S35726); 1 female, 1 juv., Expedition Range National Park, 25°12'S 148°59'E (QM S63829); 1 male, Ferny Grove, 27°24'S 153°03'E (QM); 1 male, Ferny Hills, Brisbane, 27°23'S 152°56'E (QM); 1 male, Fig Tree Pocket, Brisbane, 27°28'S 153°01'E (QM); 1 female, same locality (QM); 2 females, Forty Mile Scrub, SW Mt Garnett, 18°05'S 144°51'E (QM); 1 male, 1 female, Freshwater, near Cairns, 16°50'S 145°40'E (AM KS44456); 2 females, Friday Island, 10°36'S 142°10'E (QM); 1 male, Gladstone, 23°50'S 151°15'E (QM S25524); 1 female, Glass House Mountains, 26°54'S 152°57'E (QM); 1 female, Gold Coast, 27°30'S 152°55'E (QM S3487); 3 females, Goodna, 27°37'S 152°54'E (QM); 1 male, Gracemere, 23°26'S 150°27'E (AM KS33344); 1 female, Greenbank, Brisbane, 27°41'S 152°59'E (QM); 1 female, Grovely, Brisbane, 27°24'S 152°58'E (QM); 1 female, Gympie, 26°11'S 152°39'E (WAM T67955); 1 female, same locality (QM); 1 female, same locality (QM); 1 female, 2 juv., Hammond Island, Torres Strait, 10°32'S 142°13'E (QM); 1 female, Hann River, 14°56'S 144°04'E (QM); 1 female, Hatton Vale, 27°34'S 152°29'E (QM); 3 females, Helenvale, S of Cooktown, 15°43'S 145°13'E (AM KS3290); 1 female, Helidon, 27°33'S 152°08'E (QM); 1 female, Hemmant, 27°28'S 153°03'E (QM); 1 female, Herberton, NEQ, 17°23'S 145°23'E (QM); 1 female, Heron Island, 23°27'S 151°55'E (QM); 1 male, same locality (QM); 1 male, Holland Park, 27°28'S 153°01'E (QM S29686); 1 female, same locality (QM); 4 females, Homevale, 21°24'S 148°33'E (QM); 1 male, 3 females, Horn Island, Torres Strait, 10°37'S 142°17'E (QM S12336); 1 female, same locality (QM); 1 female, 3 juv., Hurdle Gully, 14.8 km WSW Monto, 24°55'S 150°59'E (QM S44165); 1 female, Inala, 27°36'S 152°58'E (QM S15569); 2 females, same locality (QM S15572); 1 female, same locality (QM S21655); 1 male, 3 females, Indooroopilly, 27°30'S 152°58'E (QM); 1 male, Ipswich, 27°37'S 152°47'E (QM S35592); 1 female, same locality (QM); 1 male, same locality (QM); 1 male, Jardine River, Cape York, 11°09'S 142°22'E (QM); 1 female, Jardine River, Cape York Park (QM); 1 female, Jaxut State Forest, 20°49'S 148°03'E (QM); 1 female, Jondaryan, 27°22'S 151°36'E (QM); 1 female, same locality (QM); 1 female, Kallangur, Brisbane, 27°15'S 153°00'E (QM S21552); 1 female, Kingaroy, 26°33'S 151°55'E (QM S21536); 1 male, Kingscliff, 28°15'S 153°36'E (QM S50027); 1 female, Koah Road, 16°49'S 145°31'E (QM); 1 female, Koongal, 23°23'S 150°33'E (AM KS33348); 1 female, same locality (AM KS33391); 1 female, 1 juv., Kuraby, 27°37'S 153°05'E (QM S41024); 1 female, Kuranda, top of the Range Estate, 16°49'S 145°38'E (AM KS9285); 1 female, Lake Nuga Nuga, 24°59'S 148°40'E (QM);1 female, Lamington National Park, road from O`Reilly`s to Canungra, ca 12 km, 28°08'S 153°06'E (NHMD 12368); 2 females, same locality (NHMD 12367); 1 female, Lindeman Island, 20°27'S 149°02'E (AM KS68016); 1 female, Liverpool Creek, Sth Johnston, 17°43'S 146°06'E (QM S69652); 1 female, Logan City region, 27°54'S 153°00'E (QM S30633); Logan River near Beenleigh, 27°42'S 153°11'E, 1 female (SAM); 1 female, Mackay, 21°09'S 149°11'E (QM); 1 female, Maleny, 26°46'S 152°51'E (QM S18830); 1 female, Manly, Brisbane, 27°28'S 153°11'E (QM); Maryborough, 25°32'S 152°42'E, 1 male (QM S18837); 1 female, Maryborough, Aberdeen St, 25°32'S 152°42'E (QM S21656); 1 male, Mingela, 16 km N, S of Townsville, 19°53'S 146°38'E (QM); 1 male, Moa Island, Torres Strait, 10°11'S 142°16'E (QM); 3 females, Molangdool, 24°45'S 151°33'E (AM KS3291); 1 female, Monto, 24°52'S 151°07'E (QM); Montville, 26°42'S 152°54'E, 1 female (QM); 1 female, Mooloolah, 26°45'S 153°00'E (QM); 1 female, Mooloolah River mouth, 26°45'S 153°00'E (QM); 1 female, Morningside, Brisbane, 27°28'S 153°01'E (QM); 1 female, same locality (QM); 1 female, Mt Cleveland, 19°15'S 147°01'E (QM S17855); 2 females, 1 juv., same locality (QM S40741); 1 male, Mt Coolum, 26°34'S 153°05'E (QM); 1 male, Mt Coo-Tha, 27°29'S 152°57'E (QM); 1 male, Mt Cotton, Scotts Dam, 27°36'S 153°13'E (QM S46389); 1 female, Mt Dryander, lower slopes, North of Prosperine, 20°15'S 148°32'E (AM KS12843); 1 male, Mt Gavial, 1 km S, 23°36'S 150°29'E (QM S69380); 1 female, Mt Gravatt, 27°32'S 153°04'E (QM S15586); 1 male, same locality (QM); 1 female, same locality (QM); 1 male, Mt Greville, 28°05'S 152°30'E (QM S356); 1 male, same locality (QM S357); 1 female, same locality (QM S358); 1 female, same locality (QM); 1 female, Mt Larcom, 23°49'S 150°59'E (QM); 4 females, 2 juv., Mt Molloy, 16°41'S 145°20'E (QM); 1 female, same locality (QM); 1 female, same locality (QM); 1 female, same locality (QM); 1 female, Mt Pleasant, 27°10'S 151°23'E (QM); 1 male, Mt Robert, 2 km NNW, 21°21'S 148°29'E (QM S69329); 1 female, Murray Island, Torres Strait, 9°56'S 144°04'E (AM KS33719); 3 females, same locality

(QM); 1 female, Nambour, 26°38'S 152°58'E (QM); 1 female, Nandroya, via Cooroy, 26°25'S 152°55'E (QM); 1 female, Natural Bridge, 28°13'S 153°13'E (QM S63850); 1 female, Natural Bridge, via Nerang, 28°13'S 153°13'E (QM); 1 female, 1 male, Nelson, 12°38'S, 143°15'E (AM KS3289); 1 female, same locality (QM); 1 male, Nipping Gully, 25°39'S 151°25'E (QM S51943); 1 female, North Stradbroke Island, Enterprise Mine, 27°35'S 153°27'E (QM S55635); 1 female, North Stradbroke Island, Enterprise Mine, 27°35'S 153°26'E (QM S56227); 1 female, North Tamborine, 27°54'S, 153°11'E (QM); 1 female, Norwest Islet, 10°40'S, 142°07'E (AM KS33720); 1 female, Numinbah Valley, 28°09'S, 153°14'E (QM S42059); 1 female, Palm Beach, 28°07'S, 153°27'E (QM); 2 males, Percy Island, 21°42'S 150°20'E (QM); 2 females, Petrie, 27°16'S 152°59'E (QM); 1 female, Pine Islet Light, Percy Island Group, 21°39'S 150°39'E (QM); 4 females, Prince of Wales Island, 10°41'S 142°09'E (QM); 1 female, Proserpine, 20°24'S 148°35'E (QM); 1 female, same locality (QM); female, same locality (QM); 1 female, QRS Arboretum, 17°16'S, 145°28'E (T151643); Raceview, 1 female, Ipswich, 27°37'S 152°45'E (QM S30688); 1 male, Robina, 28°04'S 153°24'E (QM S21635); 1 female, Rochedale, 27°37'S 153°09'E (QM S35761); 1 male, same locality (QM); 1 female, Rockhampton, 23°22'S 150°30'E (NHM 7736); 2 females, same locality (NHM 1915.3.5.990-991); 1 female, same locality (ZMH); 1 female, same locality (ZMH); 2 males, same locality (ZMH); 1 male, 4 females, 1 juv., Rockhampton, 23°22'S 150°32'E (NHM 4226–30, 4231–2); 1 male, 2 juv., same locality (QM); 1 male, same locality (QM); 1 female, same locality (QM), 3 females, same locality (QM); 1 female, Rosalie, 27°28'S 153°03'E (QM); 1 female, Saibai, Torres Strait, 9°23'S 142°40'E (QM); 1 female, Salisbury, Brisbane, 27°28'S 153°03'E (QM); 1 female, Santa Barbara, Hope Island, 27°52'S 153°22'E (QM S35960); 1 female, Sarina, near, 21°25'S 149°13'E (SAM); 1 female, 3 juv., Shiptons Flat, 15°48'S 145°15'E (QM); 1 female, Silver Valley, via Atherton, 17°32'S 145°15'E (MV K-2634); 1 female, Somerset Dam, 27°07'S 152°33'E (QM W1544); 1 female, same locality (QM); 1 male, South Brisbane, 27°28'S 153°01'E (QM S35221); 1 female, St Lucia, 27°28'S 153°01'E (QM S40703); 4 males, Stafford, Brisbane, 27°28'S 153°03'E (QM); 1 female, same locality (QM); 1 female, Stewart River, 26°37'30.5"S, 151°32'45.3"E (QM); 1 male, Strathpine, 27°28'S 153°01'E (QM); 2 males, Tarragindi/Moorooka, 27°32'S 153°03'E (QM); 2 females, 4 juv., Terry Beach, Prince of Wales Island, 10°41'S 142°09'E (QM); 1 female, The Gap, Brisbane, 28°27'S 153°01'E (QM S21642); 1 female, same locality (QM); 1 male, The Granga, Brisbane, 27°28'S 153°01'E (QM S21636); 1 female, Thursday Island, Torres Strait, 10°35'S 142°13'E (AM KS3293); 1 female, Toowong, 27°28'S 153°01'E (QM); 1 male, Toowoomba, 27°33'S 151°58'E (QM S15647); 1 female, same locality (QM); 1 male, Torbanlea, 25°21'S 152°34'E (QM); 1 female, Torilla, 80 mi N, 21°32'S 149°16'E (QM W38); 1 female, Torwood, 17°22'S 143°45'E (QM); 1 male, Townsville, Environmental Park, 19°15'S 146°49'E (WAM T65679); 1 female, Trinity Park, 16°48'S 145°42'E (AM KS50775); 1 female, Tully, 16°48'S 145°42'E (MV K-2622); 1 male, Upper Mt Gravatt, 27°33'S 153°04'E (QM S29736); 1 female, Warana, 26°43'S 153°08'E (QM S35504); 1 male, Waterford, Brisbane, 28°28'S, 153°01'E (QM S20317); 1 male, Wavell Heights, Brisbane, 27°24'S 153°02'E (QM); 1 female, West End, Brisbane, 27°02'S 153°01'E (QM S21665); 1 female, Westwood, near Rockingham, 23°37'S 150°39'E (NHM 1923.3.24); 1 female, Woodford, 26°57'S 152°46'E (QM S20393); 1 female, Woongoolba, 27°44'S 153°20'E (QM W488); 1 male, 3 females, Wyberton, 9 km W on road to Irvingbank (NHMD 12369); 1 male, Zillmere, Brisbane, 27°21'S 153°03'E (QM); 1 female, same locality (QM); 1 female, same locality (QM); 1 female, Tamborine National Park, Witches Falls, 27°56'S 153°10'E (NHMD). **Western Australia:** 1 female, Walcot Inlet South, 16°27'S 124°46'E (WAM T77186).

***Hortophora urbana* comb. nov.**

Australia: New South Wales: 1 female, Bayles Creek, Cheltenham, 33°45'S, 151°05'E (AM KS56898); 1 female, Beecroft, 33°45'S, 151°04'E (AM KS45382); 1 female, same locality (AM KS45387); 1 female, same locality (AM KS45388); 1 female, same locality (AM KS46029); 1 female, same locality (AM KS50208); 1 female, same locality (AM KS51182); 1 female, same locality (AM KS51183); 1 female, same locality (AM KS51187); 1 female, same locality (AM KS53703); 1 male, same locality (AM KS54417); 1 male, same locality (AM KS54422); 1 male, same locality (AM KS54426); 1 male, same locality (AM KS54434); 1 female, same locality (AM KS56919); 1 male, same locality (AM KS56931); 1 male, same locality (AM KS58648); 1 male, same locality (AM KS58650); 1 male, same locality (AM KS58724); 1 male, same locality (AM KS58986); 1 male, same locality (AM KS66202); 1 male, same locality (AM KS66273); 1 male, same locality (AM KS66275); 1 male, same locality (AM KS66276); 1 male, same locality (AM KS76785); 1 female, same locality (AM KS76870); 1 female, same locality (AM KS78323); 1 female, same locality (AM KS84246); 1 male, same locality (AM KS84249); 1 female, same locality (AM KS84250); 1 female, same locality (AM KS84251); 1 male, same locality (AM KS84283); 1 female, same locality (AM KS87265); 1 female, same locality (AM KS87316); 1 female, same locality (AM KS88797); 1 male, Cheltenham, 33°45'S, 151°05'E (AM KS56890); 1 female, Dishappy State Forest, 33°49'45.2"S, 150°58'49.0"E (AM KS75491); 1 female, Epping, 33°46'S, 151°05'E (AM KS54215); 1 female, Fraser Reserve, Wahronga, 33°42'17.8"S, 151°07'34.0"E (AM KS58675); 1 male, same locality (AM KS46033); 1 female, Gosford, 33°25'S, 151°20'E (MV K-10373); 1 female, Green Cape, 37°12'S, 149°59'E (AM KS51597);

1 female, Jamberoo Mountain, 34°39'S, 150°46'E (AM KS46006); 1 female, same locality (AM KS53713); 1 female, same locality (AM KS53723); 1 female, same locality (AM KS54083); 1 male, same locality (AM KS54094); 1 female, same locality (AM KS54102); 1 female, same locality (AM KS56747); 1 male, same locality (AM KS56750); 1 female, same locality (AM KS56900); 1 male, same locality (AM KS56916); 1 female, same locality (AM KS58640); 1 female, same locality (AM KS58641); 1 female, same locality (AM KS58642); 1 male, same locality (AM KS58654); 1 male, same locality (AM KS58655); 1 female, same locality (AM KS58726); 1 female, same locality (AM KS64967); 1 female, same locality (AM KS65667); 1 male, same locality (AM KS65671); 1 female, same locality (AM KS65832); 1 female, same locality (AM KS66229); 1 female, same locality (AM KS66231); 1 female, same locality (AM KS66240); 1 female, same locality (AM KS66249); 1 female, same locality (AM KS66251); 1 male, same locality (AM KS66256); 1 female, same locality (AM KS76936); 1 female, same locality (AM KS76938); 1 female, Ku-Ring-Gai Chase National Park, McCarrs Creek, 33°39'S, 151°15'E (NHMD); 1 female, same locality (AM KS65074); 1 female, Moonan Flats, 31°55'S, 151°14'E (AM KS34338); 1 female, Mosman, 33°49'S, 151°14'E (AM KS34125); 1 male, Mt Colah, 33°39'S, 151°07'E (AM KS35068); 1 female, Pebbly Beach campsite, 35°36'S, 150°19'E (AM KS54221); 1 female, Seven Mile Beach, 34°48'25.1"S 150°45'32.8"E (AM KS37326); 1 female, Sugar Creek Flora Reserve, 32°18'S, 152°27'E (AM KS10218). **Queensland:** 1 male, Blackdown Tableland, via Dingo, 23°50'S, 149°03'E (QM); 1 female, Brisbane, 27°28'S, 153°01'E (QM S20326); 1 female, Dandabah, Bunya Mountains National Park, 23°50'S, 149°03'E (QM S111971); 1 female, 3 juv., Hurdle Gully, 13 km SW Monto, 24°54'S, 150°59'E (QM S59951); 1 female, Jamboree Mountains, 27°33'S, 152°56'E (AM KS58618); 1 male, Kirrama Range, Douglas Creek Road, 18°12'S, 145°45'E (QM S111918); 1 female, Kroombit Crossing, Kroombit Tops, 24°22'S, 151°01'E (QM); 1 male, 6 juv., same locality (QM); 1 male, Lamington National Park, 28°12'S, 153°10'E (QM S111900); 1 female, same locality (QM S111900); 1 female, Mt Glorious, 28°12'S, 153°10'E (QM); 1 female, labelled "National Park" (no exact locality) (QM); Three Moon Creek, Kroombit Tops, 24°22'S, 151°01'E, 2 females (QM S111919); 1 female, same locality (QM S111902); **Western Australia:** 1 female, Mt Trafalgar, under cliffs, site 14/3, camp site, 15°16'50"S, 125°04'05"E (WAM T136093); 1 female, Walcot Inlet South, 16° 27'S, 124° 46'E (WAM T77187).

***Hortophora walesiana* comb. nov.**

Material examined. **Australia: Northern Territory**: 1 female, Melville Island, 17 Mile Plains, 11°33'S,130°56'E (NTMAG). **Queensland**: 1 female, Bruce Highway, 4 km S Bowen, 20°02'S, 148°14'E (NMV K-10368); 1 female, Camp Milo, Cooloola, 26°S, 153°05'E (QM); 1 female, Gillies Highway, 17°16'22.4"S, 145°36'41.7"E (QM S46377); 1 female, Horn Island, Torres Strait, 10°37'S, 142°17'E (QM); 1 male, Polly Creek, Garradunga, 23°02'S, 148°52'E (QM S80455); 1 male, 1 juv., Prince of Wales Island, 10°41'S, 142°11'E (QM); 1 female, Upper Brookfield, 27°28'S, 152°51'E (QM). **Western Australia**: 1 female, Barrow Island, Gorgon Project footprint, 20°47'S 115°26'E (WAM T88936); 1 juv., Barrow Island, 20°46'44.6"S, 115°27'07.0"E (HBI N6479-11); 1 juv., Barrow Island, 20°44'58.0"S, 115°27'48.5"E (HBI N15963-6); 1 juv., Barrow Island, 20°44'57.5"S, 115°27'48.0"E (HBI N15964-4); 1 juv., Barrow Island, 20°48'52.8"S, 115°26'29.9"E (HBI N16292-7); 1 female, Barrow Island, 20°42'50.3"S, 115°26'23.1"E (HBI N16700-4); 1 juv., Barrow Island, 20°44'42.8"S, 115°28'18.6"E (HBI N18948-8); 1 male, Barrow Island, Butler Park (previously Construction Camp), 20°49'07.0"S, 115°26'26.2"E (HBI N5471-1); 1 juv., Barrow Island, Airport, 20°51'36.0"S, 115°24'00.0"E (HBI N15298-15); 1 juv., Barrow Island, 20°44'36.8"S, 115°28'20.7"E (HBI N15961-37); 1 juv., same locality (HBI N15961-38); 1 female, Barrow Island, 20°51'53.5"S, 115°20'45.7"E (HBI N16707-15); 1 female, Barrow Island, 20°47'21.3"S, 115°27'37.2"E (HBI N17201-12); 1 female, Barrow Island, Curtin GP6 (2006), 20°47'04.7"S, 115°26'27.8"E (HBI N6680-1); 1 female, Barrow Island, drainage area behind airport, 20°51'46.9"S, 115°23'02.8"E (HBI N17203-7); 1 juv., Barrow Island, Gas Treatment Plant/QCC, 20°48'02.0"S, 115°26'30.2"E (HBI N16062-2); 1 juv., Barrow Island, Gas Treatment Plant/QCC, 20°47'08.6"S, 115°27'32.4"E (HBI N16063-3); 2 female, 1 juv., Barrow Island, Gas Treatment Plant/QCC; Terminal Tank Road, 20°46'43.2"S, 115°27'25.3"E (HBI N17202-3); 1 female, Barrow Island, GTP, 20°47'49.4"S, 115°26'28.0"E (HBI N25742-6); 1 juv., Barrow Island, Old Airport, 20°47'51.2"S, 115°25'56.6"E (HBI N16053-1); 1 juv., Barrow Island, Old Airport, 20°47'52.4"S, 115°25'56.7"E (HBI N16054-2); 1 female, Barrow Island, Old Airport, 20°47'51.1"S, 115°25'57.6"E (HBI N16481-12); 1 female, Barrow Island, old pipe dump, 20°47'00.0"S, 115°26'00.0"E (WAM T88936); 1 male, Barrow Island, WA Oil Base, 20°49'09.5"S 115°23'12.7"E (HBI N25307-6); 1 male, same locality (HBI N25309-8); 1 male, Drysdale River Station, 15°42'S, 126°23'E (WAM T75383); 1 male, Marigui Promontory, NW Kimberley; site 22/2-S1, 15°20'44.5"S, 124°54'54.7"E (HBI N17949-1).

***Hortophora yesabah* sp. nov.**

Australia: New South Wales: 1 female, Jamberoo Mountain, 34°40'S, 150°43'E (AM KS54087); 1 female, same locality (AM KS62805); 3 males, 4 females, Park Beach, Coffs Harbour, 30°18'S, 153°07'E (SAM);

1 male, Richmond Range, 28°59'S, 152°45'E (QM); 1 male Yesabah Bat Cave, near Kempsey, 31°05'S, 152°43'E (AM KS72945). **Queensland:** 1 female, Dandabah, Bunya Mountains National Park, 26°51'S, 151°34'E (QM S111897); 1 female, same locality (S111898); 1 female, 1 juv., same locality (S111899); 1 male, Lamington National Park, near O`Reillys Guesthouse, 28°14'S, 153°08'E (NHMD 12332); 1 male, 2 juv., Searys Scrub, Great Sandy (= Cooloola) National Park, 24°59'S, 153°16'E (QM).